# MULTI-JURISDICTIONAL MITIGATION PLAN

# Leavenworth County, Kansas

Submitted by:

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# Hazard Mitigation Plan

## 1.0 Introduction

This Hazard Mitigation Plan is a guide for Leavenworth County citizens to prepare for possible natural disaster events by taking action to help mitigate the effects of potential hazards. The plan was prepared for Leavenworth County and participating local jurisdictions through the efforts of the Mitigation Planning Committee (MPC) in conjunction with E-Fm Consulting, LLC. As part of an overall multi-jurisdictional planning effort, this plan has been created by the participating entities to comply with the Disaster Mitigation Act of 2000 (Public Law 106-390, hereinafter referred to as DMA 2000).

Section 1.0 provides a general introduction to the Leavenworth County Multi-Jurisdictional Hazard Mitigation Plan. It is organized into the following five sections:

1.1. Background 1.2. Purpose 1.3. Scope 1.4. Authority 1.5 Paper Reduction

## 1.1 Background

Natural phenomena such as floods, tornadoes, and severe storms, are a part of the world around us. As part of nature, their occurrence is inevitable; there is little we can do to control their force and intensity. However, through hazard mitigation planning, we can minimize the impact these events have on our lives and property.

Hazard mitigation is simply a technical term for reducing risk to people and property from natural hazards. It includes structural measures, such as protecting buildings and infrastructure from the forces of wind and water, as well as non-structural measures, such as natural resource protection and wise floodplain management. These activities can help protect both existing development and, by mitigating potential hazards to new construction, future development. It is widely accepted that the most effective mitigation measures are implemented at the local government level, where decisions on the regulation and control of development are ultimately made.

The easiest and best way a jurisdiction can develop serious intentions about hazard mitigation is through the development and adoption of a local hazard mitigation plan. A mitigation plan will ensure that measures to reduce the present and future vulnerability of a jurisdiction are thoroughly considered before, during, and after a disaster strikes. Mitigation planning in compliance with the requirements of DMA 2000 offers many benefits. These include:

- saving lives and property;
- saving money;
- speeding recovery following disasters;
- reducing future vulnerability through wise development / redevelopment;
- expediting both pre-disaster and post-disaster grant funding by demonstrating a firm commitment to improving jurisdiction health and safety.

Recently, both the State of Kansas and the U.S. Congress made the development of a hazard mitigation plan a specific eligibility requirement for any local jurisdiction applying for mitigation grant funding. Jurisdictions with an adopted plan will therefore become pre-positioned and more apt to receive any available mitigation funds.

More importantly, mitigation planning has the potential to produce long-term and recurring benefits by breaking the repetitive cycle of disaster loss. A core assumption of mitigation is that current dollars invested in mitigation practices will significantly reduce the demand for future dollars by lessening the amount needed for emergency recovery, repair and reconstruction in the event of a disaster. These mitigating practices will assist residents, their businesses and local industries to recover faster in the wake of a disaster, enabling the jurisdiction's economy to re-establish itself sooner and with less interruption.

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Mitigation planning will also lead to benefits beyond the main purpose of hazard vulnerability reduction. Measures such as the acquisition or regulation of land in known hazard areas can help achieve jurisdictional goals such as preserving open space, maintaining environmental health and natural features, and enhancing recreational opportunities.

## 1.2 Purpose

As mentioned above, this plan was created in an effort to help Leavenworth County and participating local jurisdictions to come into compliance with the requirements of DMA 2000. The purpose of this Hazard Mitigation Plan is:

- To protect against the loss of life in the event of a disaster;
- To preserve the safety of persons and property by reducing the risk of potential damage and economic loss in the event of a disaster;
- To qualify for additional grant funding, both pre- and post-disaster;
- To qualify for participation in the National Flood Insurance Program (NFIP), and the Community Rating System (CRS) to receive additional credits under the program;
- To speed recovery and redevelopment following future disaster events;
- To demonstrate a firm local commitment to hazard mitigation principles;
- To comply with both state and federal legislative requirements for local hazard mitigation plans.

## 1.3 Scope

This Multi-Jurisdictional Mitigation Plan was developed under a Federal Emergency Management Agency (FEMA) hazard-planning grant awarded to Leavenworth County through the Kansas Division of Emergency Management. Leavenworth County approved E-Fm Consulting, LLC's contract on January 7, 2008.

The Plan identifies natural and State-mandated hazards associated with the county, but is developed primarily to address the two highest priority classifications of high and moderate hazards. Other hazards identified during the hazard and vulnerability analysis that were classified as low and negligible were statistically eliminated from priority planning based on the probability (likelihood) and vulnerability (severity) of these hazard events, or county internal and fiscal capabilities. The Mitigation Planning Committee (MPC) may add specific hazards to the prioritized hazards list to ensure local planning needs are met. Hazards will be reviewed on a routine basis with plan updates as circumstances change.

The geographic scope for the Hazard Mitigation Plan includes both the incorporated and unincorporated areas of Leavenworth County, as provided in Section 2.0 of this plan.

## 1.4 Authority

Local governments in Kansas have a wide range of tools available to them for implementing mitigation programs, policies and actions. In implementing a mitigation plan or specific action, a local jurisdiction may utilize any or all of the four broad types of government authority granted by the State of Kansas. These four types of authority are defined as: (a) Regulation; (b) Acquisition; (c) Taxation; (d) Spending.

The scope of this local authority is subject to constraints, however, as all of Kansas political subdivisions must not act without proper delegation from the State. Under a principle known as Dillon’s Rule, all power is vested in the State and can only be exercised by local governments to the extent it is delegated.

Kansas local governments have been granted broad regulatory powers in their jurisdictions. Kansas General Statutes (K.A.R.) bestow the general police power on local governments, allowing them to enact and enforce ordinances which define, prohibit, regulate or abate acts, omissions, or conditions detrimental to the health, safety, and welfare of the people, and to define and abate nuisances (including public health

nuisances).

Since hazard mitigation can be included under the police power (as protection of public health, safety, and welfare), towns, cities, and counties may include requirements for hazard mitigation in local ordinances. Local governments may also use their ordinance-making power to abate nuisances, which could include, by local definition, any activity or condition making people or property more vulnerable to any hazard. After approval of the Multi-Jurisdictional Plan by the State of Kansas and FEMA (ref. Sec. 2.2), the plan can then be implemented by the County Board of Commissioners and the Executive Officers of the local jurisdictions under the authority of and by the police powers bestowed on them by the State of Kansas.

This Plan has been developed to be in accordance with current rules and regulations governing local hazard mitigation plans. The Plan shall be routinely monitored to maintain compliance with the following legislation:

> 1. Home Rule Powers: Article 12 Section 5 – Kansas Constitution 2. Kansas Emergency Planning and Jurisdiction Right-to-Know Act, K.S.A. 65-5701 through 65-5711, and Superfund Amendments and Reauthorization Act of 1986 (SARA), Title III, Emergency Planning and Jurisdiction Right-to-Know Act (EPCRA), Pub. L. 99-499 (a) Federal Civil Defense Act of 1950, Pub. L. No. 81-920, as amended (b) K.A.R. 56-2, Standards for Local Disaster Agencies 3. The Robert T. Stafford Disaster Relief and Emergency Assistance Act as amended by the Disaster Mitigation Act of 2000 (Public Law 106-390 – October 30, 2000).

## 1.5 Paper Reduction and Elimination

It is the goal of this planning process to comply with the overall direction to reduce or eliminate the use of paper. The 1998 Government Paper Elimination Act (GPEA), and consequent clarification by the Office of Management and Budget, asks all entities to consider eliminating paper as the vehicle to provide information or data to and from the Federal government. This mitigation plan is intended to be read, maintained, and edited in its online version.

As an interim step towards this goal, the plan can be printed using the standardized portable document format (PDF). When printed in this format, the formatting that is seen on-the-screen has been reduced and partially compacted in order to save paper when ultimately printed. Consequently, text may not carry with the associated table or image to the next page. The full content will be included in the PDF file. Thank you for your consideration of the Planning Committee's goal.

# 2.0 Planning Process

*• Multihazard Requirement §201.6(a)(3): Multi-jurisdictional plans (e.g., watershed plans) may be accepted, as appropriate, as long as each jurisdiction has participated in the process … Statewide plans will not be accepted as multi-jurisdictional plans.*

Hazard Mitigation is defined as any sustained action taken to reduce or eliminate long-term risk to human life and property from hazards. Planning is the process of setting goals, developing strategies, and outlining tasks and schedules to accomplish those goals.

Hazard mitigation planning is the process through which natural hazards that threaten jurisdictions are identified, the probability and severity of those hazards are determined and prioritized, mitigation goals are set, and appropriate strategies are created to meet those goals.

Hazard mitigation planning is required for state and local governments to maintain their eligibility for certain federal disaster assistance and hazard mitigation funding programs. Jurisdictions at risk from natural disasters can ill afford to jeopardize this funding.

Each year, natural disasters in the United States kill hundreds of people, injure thousands more and destroy private and public property and infrastructure. Nationwide, taxpayers pay billions of dollars annually to help jurisdictions, organizations, businesses and individuals recover from disasters. These monies only partially reflect the true cost of disasters, because additional expenses to insurance companies and non-government organizations are not reimbursed by tax dollars. Additionally, many natural disasters are predictable. Many more are repetitive, often with the same results. Many of the damages caused by these events can be alleviated or even eliminated.

FEMA, the Federal Emergency Management Agency, now a part of the Department of Homeland Security, has targeted reducing losses from natural disasters as one of its primary goals. Hazard mitigation planning and subsequent implementation of projects, measures, and policies developed through those plans, is the primary mechanism for achieving these goals. As a result of successful mitigation planning, when mitigation projects have been implemented, damages have been reduced. More importantly, proactive mitigation planning at the local level can help reduce the cost of disaster response and recovery to property owners and government by protecting critical facilities, reducing liability exposure, and minimizing overall jurisdiction impacts and disruption.

## 2.1 Participants

*Multihazard Requirement §201.6(c)(1): [The plan shall document] the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.*

The Mitigation Planning Committee (MPC) represents local government entities, including incorporated cities, towns, schools, and other qualified government entities (referred to as sub-jurisdictions) in Leavenworth County. The MPC seeks a coordinated and active mitigation planning process with full participation in plan development and implementation. This integrated planning process combines the risks, issues, goals, and mitigation measures of each jurisdiction to form a Multi-Jurisdictional Mitigation Plan.

Representatives for participating jurisdictions attended committee meetings and completed planning activities during the drafting stage of the plan. The minimum level of committee participation for each jurisdiction was achieved by one or more representatives that were actively involved in the planning activities conducted during the drafting phase of the plan. Authorized representatives for any given jurisdiction are provided in Table 2.1 (1).

The participants in the development of this Multi-Jurisdictional Mitigation plan, which was completed in 2010, included input and comment from individuals, local and state public agencies, private groups, business operators and owners, including the following persons, who collectively serve to make up the

Leavenworth County Mitigation Planning Committee.

## TABLE 2.1 (1) LEAVENWORTH COUNTY MITIGATION PLANNING COMMITTEE

TABLE 2.1 (1) LEAVENWORTH COUNTY MITIGATION PLANNING COMMITTEE

| Jurisdiction | Responsible Party | Position | Phone | Email |
|---|---|---|---|---|
| Leavenworth County | Mr. Chuck Magaha | Emergency Coordinator | 913-684-0455 | cmagaha@leavenworthcounty.org |
| City of Basehor | Chief Lloyd Martley | Chief of Police | 913-724-1370 xt. 22 | chief@basehorpolice.org |
| City of Easton | Mr. Phillip Mires | Mayor | 913-773-8146 | |
| City of Lansing | Mr. John Young | Director of Public Works | 913-727-2400 | jyoung@lansing.ks.us |
| City of Leavenworth | Mr. Michael McDonald | Director of Public Works | 913-684-0375 | mmcdonald@firstcity.org |
| City of Linwood | Ms. Karen Kane | City Clerk | 913-301-3024 | cityoflinwood@sunflower.com |
| City of Tonganoxie | Ms. Kathy Bard | Assistant City Administrator, City Clerks Office | 913-845-2620 xt. 1104 | cityclerk@tongie.org |
| USD 449 Easton | Dr. Charles Coblentz | Superintendent | 913-651-9740 | ccoblentz@easton449.org |
| USD 453 Leavenworth | Ms. Carol Ayres | Director of Foundation | 913-684-1400 | carol.ayres@usd453.org |
| USD 458 Basehor-Linwood | Dr. Robert Albers | Superintendent | 913-724-1396 | ralbers@usd458.org |
| USD 464 Tonganoxie | Mr. Kyle Hayden | Superintendent | 913-845-2153 | khayden@tong464.org |
| USD 469 Lansing | Dr. Randal Bagby | Superintendent | 913-727-1100 | rbagby@palmleaders.net |
| University of St. Mary | Mr. Matt Boos | Director of Public Safety and Compliance | 913-758-6173 | boos10@stmary.edu |

### Participating Jurisdictions

The following jurisdictions were invited to participate in the Leavenworth County planning process. Plan participation was accomplished by jurisdictional representation in one of three ways: (1) direct representation by a person from the jurisdiction, or (2) delegation of jurisdictional representation to a qualified third party, or (3) delegation of jurisdictional representation to a consultant contracted for the project.

## TABLE 2.1 (2) JURISDICTIONS

TABLE 2.1 (2) JURISDICTIONS

| | |
|---|---|
| Leavenworth (UnInc.) | UnInc |
| Basehor | Inc |
| Easton | Inc |
| Lansing | Inc |
| Leavenworth | Inc |
| Linwood | Inc |
| Tonganoxie | Inc |
| University of St. Mary | School |
| USD 449 | School |
| USD 453 | School |
| USD 458 | School |
| USD 464 | School |
| USD 469 | School |

- The Leavenworth Water Department is included in the Plan as a participant under Leavenworth County (unincorporated).
- Suburban Water, Inc. is included in the Plan as a participant under Leavenworth County (unincorporated).
- The Fort Leavenworth Military Facility, as a Federal Institution, is not included in the Leavenworth County Multijurisdictional Mitigation Plan.
- Fort Leavenworth Unified School District-207 was amended to the Leavenworth County Multijurisdictional Mitigation Plan on March 30, 2012.

This plan was prepared under the direction of the MPC with the guidance and support of E-Fm Consulting, LLC, of Lawrence, Kansas.

Leavenworth County retained the services of E-Fm Consulting, LLC, 100 Riverfront Road, Suite A, Lawrence, Kansas 66044, to attend planning meetings, provide input and guidance for the hazard and risk analysis for completion of the Mitigation Plan, and publish the reports to the county's online hazard and vulnerability website. Participants from E-Fm Consulting, LLC included the following personnel:

> Dennis K. Hayward, Technical Support Richard S. Hernandez, Technical Support Dan Kostelny, Technical Support Nick Maciaszek, GIS/Maps Elizabeth Spainhour, Programming

The MPC determined that only those jurisdictions that met the participation components listed below were considered a jurisdiction in this multi-jurisdictional mitigation plan.

### Requirements

- Participate in planning meetings or coordinate with EM
- Submit inventory and summary of reports and plans relevant to hazard mitigation
- Submit unique hazards that affect the jurisdiction, with relevant documentation
- Submit a description of what is at risk, including local critical facilities and infrastructure, and which hazards posed a risk to them
- Submit a description and map(s) of local land-use patterns (current, proposed/expected)

- Develop and adopt goals and objectives for jurisdiction
- Develop mitigation actions with an analysis/explanation of why those actions were selected
- Prioritize actions emphasizing relative cost-effectiveness
- Complete questionnaire with implementation strategy
- Review and commented on draft plan
- Host opportunities for public involvement

As a minimum commitment, jurisdictions will conduct annual interviews and/or smaller meetings with civic groups, the public and other stakeholders. This will be accomplished through incorporating discussion of the mitigation plan into other regularly attended meetings.

Participating jurisdictions will consider annual flyers, newsletters, newspaper advertisements, and radio/TV announcements, and will implement some or all of the above at the discretion of the jurisdiction.

**Participating Private Non-Profit (PNP's) and Rural Electric Cooperatives (REC's)**

The following entities accepted the invitation to participate in the development of the Leavenworth County Multi-Jurisdictional Mitigation Plan, and have also included actions for hazard reduction.

**TABLE 2.1 (3) PNP's & REC's**

TABLE 2.1 (3) PNP's & REC's

| Entity | Responsible Party | Position | Phone | Email |
|---|---|---|---|---|
| Big Stranger Drainage District | Mr. Edmund J. Theis, Jr. | Board Member | 913-682-4376 | |
| Consolidated Rural Water District 1 | Mr. Mike Fulkerson | Operations Manager | 913-724-7000 | mfulkerson@crwd1.com |
| Leavenworth Rural Water District 7 | Mr. David Rinaldi | Operator / Manager | 913-481-4973 | david@leavenworthrwd7.com |
| Leavenworth - Jefferson Electric Cooperative | Mr. Larry Kitterman | Technology Manager - Operations | 913-796-6111 | larryk@ljec.coop |

## 2.2 Plan Adoption

*Multihazard Requirement §201.6(c)(5): For multi-jurisdictional plans, each jurisdiction requesting approval of the plan must document that it has been formally adopted.*

The Leavenworth County plan was developed as a multi-jurisdictional plan. Therefore, to meet the requirements of Section 322 of the local hazard planning regulations, the final plan will be adopted by each of the jurisdictions as well as the county. This section documents the adoption process of each local government in order to demonstrate compliance with this requirement. The plan will formally be adopted following conditional approval of FEMA Region VII’s review.

Table 2.2 (1) identifies the local governments that participated in the planning process and will adopt the plan. According to the participation components set by the MPC (see above Requirements, Section 2.1 Participants), these jurisdictions have met satisfactory participation requirements of this hazard mitigation plan.

NOTE: Resolutions from each Jurisdiction adopting the Plan listed in Table 2.2 (1) are provided in the

appendix.

### TABLE 2.2 (1) ADOPTION OF PLAN - §201.6(c)(5)

TABLE 2.2 (1) ADOPTION OF PLAN - §201.6(c)(5)

| Jurisdiction | Date of Adoption |
|---|---|
| City of Basehor | August 16, 2010 |
| City of Easton | August 2, 2010 |
| City of Lansing | August 5, 2010 |
| City of Leavenworth | July 27, 2010 |
| City of Linwood | August 3, 2010 |
| City of Tonganoxie | August 9, 2010 |
| University of St. Mary | August 16, 2010 |
| USD 449 | August 9, 2010 |
| USD 453 | July 18, 2011 |
| USD 458 | July 11, 2011 |
| USD 464 | August 16, 2010 |
| USD 469 | July 11, 2011 |
| Leavenworth County (Uninc.) | June 15, 2010 |
| USD 207 | March 30, 2012 |

## 2.3 Documentation of the Planning Process

*Multihazard Requirement §201.6(c)(1): [The plan shall document] the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.*

The Leavenworth County Multi-Jurisdictional Mitigation Plan is the result of a collaborative effort between Leavenworth County citizens, public agencies, and regional, state, and federal organizations. Public participation played a key role in development of goals and mitigation projects. Interviews were conducted with the Leavenworth County Emergency Coordinator, mayors, elected officials, and other organizations in the jurisdiction, and two public meetings were held to include the input of Leavenworth County residents.

In order to effectively notify the adjoining counties and invite them to contribute to the planning process, the Emergency Manager for each county was notified via mail and/or email. In Kansas, the Emergency Manager for each county has been designated as the county point-of-contact for Mitigation Planning. Each Emergency Manager is responsible to report to its Commissioners regarding any activity necessary to comply. Invitations to apply for the FEMA and State funded grants for Mitigation Planning were sent to the 105 Emergency Managers in Kansas as the designated point-of-contact for each County Commission.

Entities listed in the appendix under the Initial Contact List were notified or contacted for every meeting conducted as part of the planning process. In addition, the Leavenworth Times Newspaper was used to do public notification. The Leavenworth Times Newspaper is a regional publication with circulation in all adjoining counties.

Leavenworth County utilized the process recommended by the Kansas Division of Emergency Management (KDEM) to develop this Multi-Jurisdictional Mitigation Plan. Leavenworth County's mitigation planning process was initiated on January 7, 2008, when the county contracted with E-Fm

Consulting, LLC. to complete the Mitigation Plan. The mitigation planning process was completed over a 24-month time period, with final draft completion in January 2010.

A comprehensive hazard analysis was conducted prior to mitigation planning, and was completed over a six month period in 2004. The hazard analysis is a comprehensive assessment and prioritization of risks and vulnerability in the county. The assessment is published electronically as a stand-alone document consisting of 11 sections, and forms the basis for this mitigation plan.

Leavenworth County developed this Multi-Jurisdictional Mitigation Plan in coordination with E-Fm Consulting, LLC. Funding was provided by FEMA and the State of Kansas via a grant through the Kansas Division of Emergency Management. The overall process was developed by E-Fm Consulting, LLC, Leavenworth County Emergency Management, and the Leavenworth Mitigation Planning Committee to prepare this local mitigation plan.

### Planning

E-FM Consulting was retained to represent Leavenworth County as plan author, and provide support services to develop the hazard mitigation plan. E-Fm prioritized the natural hazards in coordination with the MPC based on likelihood and severity of each hazard for the jurisdiction. These data were used to develop the goals, objectives, and mitigation strategy for Leavenworth County.

Chuck Magaha, Leavenworth County Emergency Management Coordinator, served as the primary official contact for the county. The MPC consisted of representatives from local government agencies, private and public entities, and local businesses. The Leavenworth County MPC conducted meetings and numerous in-house discussion sessions over the course of the planning process. A number of officials at the federal, state, and local government level were contacted throughout the planning process for specific information and technical expertise.

The Leavenworth County MPC met on October 1, 2008, to review and approve the natural hazards and vulnerability prioritization assessment. The indexed (prioritized) hazards were discussed, and a wide range of mitigation actions were identified for high and moderate hazards and disseminated to committee members for further review and approval prior to the first public meeting for the county. FEMA categories for actions were also discussed in relation to projects and actions, with emphasis on implementation capabilities at the local level for prioritized projects/actions. In addition, the Mitigation Planning Committee members were provided electronic access to the county's draft plan for review and comment on the overall draft strategy to assist with development of projects and actions for each jurisdiction. During the meeting it became evident that two Leavenworth County school districts would require accelerated schedules to meet their planning requirements to qualify for FEMA grant funds to construct safe rooms. Basehor-Linwood USD 458 and Leavenworth USD 453 were granted priority scheduling, and the Leavenworth County MPC agreed to move forward with school district planning.

The first public meeting was held on December 15, 2009, to present the Leavenworth County draft plan to the MPC and interested parties in the community. Comment forms were distributed for interested parties to comment in writing to the MPC. A review of the mitigation strategy was followed by a discussion of sub-jurisdiction planning and distribution of data packets to local jurisdictions. A copy of the draft plan was made available at the Emergency Management Coordinators office and the Leavenworth County Courthouse. Notification of the first public meeting was published in the Leavenworth Times on December 4, 2009. E-Fm Consulting, LLC, provided mail invitations via postcard on December 1, 2009. The draft plan was available for public comment through December 29, 2009. The MPC did not receive any written comment on the plan.

The second public meeting was held on January 5, 2010, to present the final county draft plan to the MPC and interested parties in the community. A review of the county and participating jurisdictions was followed by a question and answer period. Forms were provided for the public to provide written

comment to the MPC. Notification of the second public meeting was provided by the Leavenworth Times Newspaper on December 22, 2009. E-Fm Consulting, LLC, provided additional mail invitations via postcard on December 23, 2009.

Meeting sign-in logs, jurisdictional authorization forms, and meeting notifications can be found in the appendix.

### Public Participation

Efforts were made to solicit public input throughout the planning process using announcements and public notification via local newspaper publications, and meeting notifications by first-class mail, phone, and email. Two public meetings were held to obtain input from the community, which included notice to businesses, non-profits, government agencies, and any others interested in the planning process. Additionally, the Emergency Management Coordinator scheduled meetings with interested parties within the county to review planning, code, land plan and flood zone planning initiatives in other departments.

Public input was solicited by direct written notices and announcement of the mitigation planning process, with public meeting schedules announced two weeks prior to convening. No written comments were received from the general public for the Leavenworth County Mitigation Plan during the planning process.

The county provided a copy of the final draft document for public review at the Leavenworth County Emergency Management Office and the Leavenworth County Courthouse prior to presentation of the final draft plan at the second public meeting. The participating jurisdictions and the County Commission tentatively approved the plan for submittal to the State Mitigation Officer on February 18, 2010, at which time no further public and private comment was received.

### Summary

In short, the process included the following steps, listed in the order in which they were undertaken:

> 1. Natural Hazards Identification and Risk Assessment 2. County Vulnerability Assessment 3. Mitigation Capabilities Assessment 4. Mitigation Strategy (Goals, Objectives, and Actions) 5. Plan Maintenance

Step 1, the hazard identification and assessment, describes and analyzes the natural phenomena present in Leavenworth County that can threaten human life and damage property. It includes historical data on past hazard occurrences, and establishes hazard profiles and risk indices based upon hazard frequency, magnitude and impact. The risk rating forms the basic foundation for focusing and prioritizing mitigation efforts.

Step 2, the county vulnerability assessment, was completed predominantly through investigative research along with the use of available data at the time of the study. It includes narrative descriptions on community characteristics, such as Leavenworth County's geographical, economic, and demographic profiles, and discusses future development trends and implications for hazard vulnerability. To graphically depict hazard vulnerability, this section also included readily-accessible county vulnerability assessment maps.

Step 3, the mitigation capabilities assessment, provides a comprehensive examination of Leavenworth County's capacity to implement meaningful mitigation strategies, and identifies existing opportunities for program enhancement. Capabilities addressed in this section include staff and organizational capability, technical capability, policy and program capability, fiscal capability, legal authority and political willpower. The purpose of this assessment is to identify any existing gaps, weaknesses or conflicts in local programs/activities that may hinder mitigation efforts, or to identify those local activities that can be built upon in establishing a successful county hazard mitigation program.

Steps 1, 2, and 3 form the basis for designing the community's hazard mitigation strategy.

Step 4, the conclusion of Steps 1, 2, and 3, results in the formation of jurisdiction strategy and sets the stage for developing and adopting a meaningful hazard mitigation plan for Leavenworth County. These four steps help make the plan strategic and functional for implementation purposes.

Step 5, which follows the completion of the mitigation strategy, concentrates on designing measures to confirm the plan's ultimate implementation, and adoption of evaluation and enhancement procedures for routine updating.

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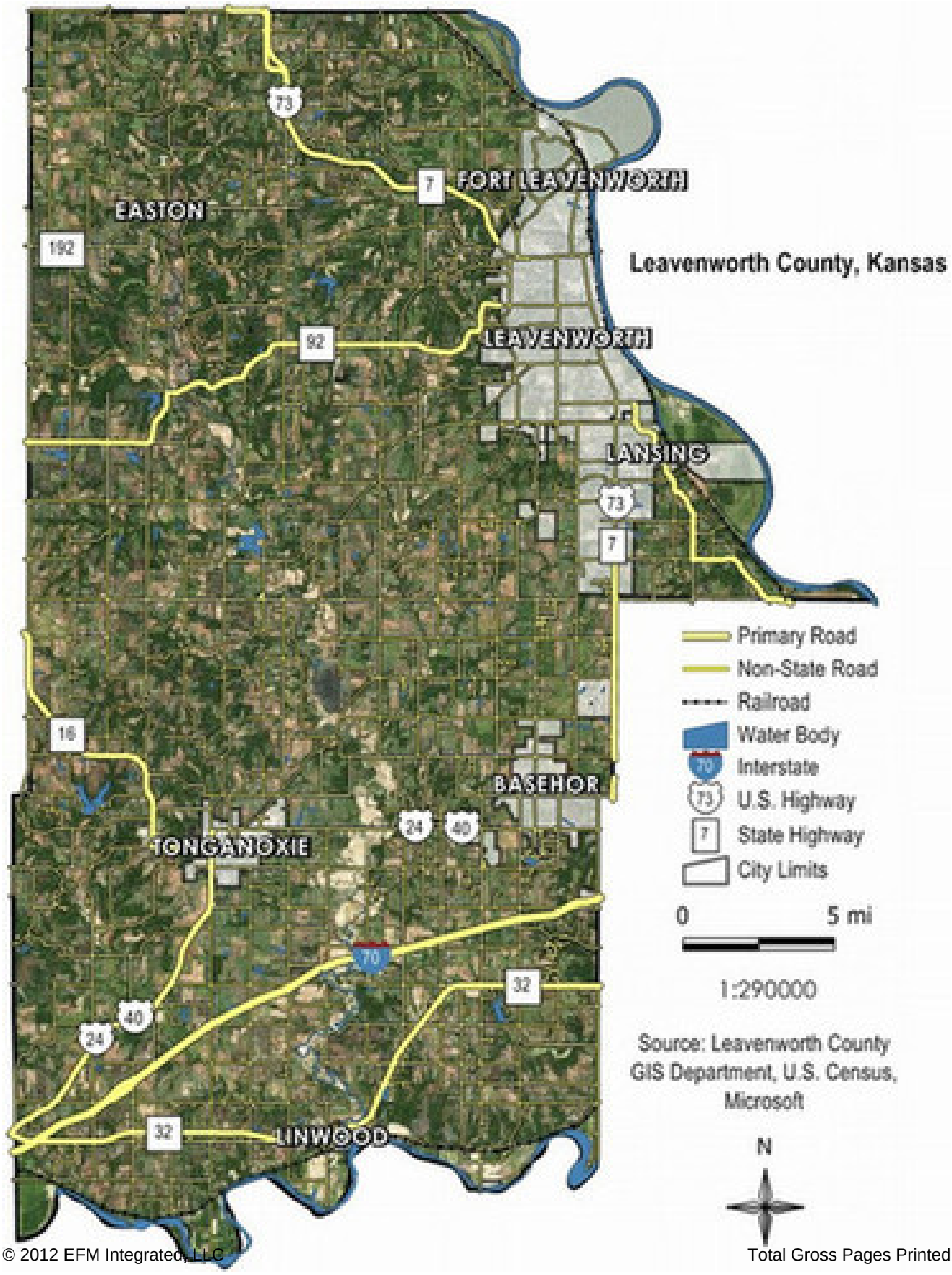
# 3.0 County Profiles

*Multihazard Requirement §201.6(c)(2)(ii)(C): [The plan should describe vulnerability in terms of] providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.*

# 3.1 Geographic Setting and History



Leavenworth County, at 463 square miles total area, is the 99th largest county in Kansas. With a 2006 estimated population of 73,628 (U.S. Estimated Pop. 2006), Leavenworth County was the 6th most populated county in the State of Kansas. There are seven incorporated municipalities in Leavenworth County. The City of Leavenworth serves as the county seat, and is also Leavenworth County's largest city. The remaining incorporated jurisdictions in the county include Tonganoxie, Lansing, Basehor, Linwood, Easton, and Bonner Springs (geographically, Bonner Springs sits in three counties: Wyandotte, Leavenworth, and Johnson. The majority of Bonner Springs is in Wyandotte County, and is included in Wyandotte County for mitigation planning purposes. Additionally, Bonner Springs currently has an approved mitigation plan for their city).

## TABLE 3.1 (1) LEAVENWORTH COUNTY CITIES, TOWNS, & VILLAGES (past and present)

TABLE 3.1 (1) LEAVENWORTH COUNTY CITIES, TOWNS, & VILLAGES
(past and present)

| Town/City | 2000 Population | Zip Code | Year | Elevation |
|---|---|---|---|---|
| Alexandria Township | 859 | | | |
| Basehor | 2238 | 66007 | 1965 | 984 |
| Delaware Township | 1361 | | | |
| Easton | 362 | 66020 | | 903 |
| Easton Township | 1245 | | | |
| Fairmount Township | 6266 | | | |
| High Prairie Township | 1768 | | | |
| Kickapoo Township | 1760 | | | |
| Lansing | 9199 | 66043 | 1859 | 794 |
| Leavenworth | 35420 | 66048 | 1854 | 900 |
| Linwood | 374 | 66052 | | 800 |
| Reno Township | 1143 | | | |
| Sherman Township | 2367 | | | |
| Stranger Township | 2451 | | | |
| Tonganoxie | 2728 | 66086 | | 853 |
| Tonganoxie Township | 4852 | | | |

Leavenworth County is located in the northeastern portion of the State of Kansas. Leavenworth County is bounded on the north by Atchison County; on the northeast by the Missouri River, which separates it from Missouri and Platte County; on the east by Wyandotte County; on the south by the Kansas River, which separates it from Johnson County and Douglas County; and on the west by Douglas and Jefferson counties.

## TABLE 3.1 (2) LAND COVER

TABLE 3.1 (2) LAND COVER

| Code | Land Cover | % Area |
|---|---|---|
| 11 | Urban Industrial/Commercial | 1.96 |
| 12 | Urban Residential | 3.70 |
| 13 | Urban Openland | 4.32 |
| 14 | Urban Woodland | 1.55 |
| 15 | Urban Water | 0.05 |
| 20 | Cropland | 16.98 |
| 30 | Grassland | 43.88 |
| 31 | Conservation Reserve Program (CRP) Land | 1.75 |
| 40 | Woodland | 23.16 |
| 50 | Water | 2.39 |
| 60 | Other | 0.25 |

The 2005 Kansas Land Cover Patterns map produced by the Kansas Applied Remote Sensing (KARS) program provides a fairly accurate assessment of 11 land use/land cover classes. The bulk of the land cover in the county (~84%) is comprised of woodland, cropland, and grassland. Cropland and woodland areas are more predominant within the Missouri River, Kansas River, and Stranger Creek basins. Surface water is primarily in the form of creeks, rivers, and numerous small to medium sized ponds and lakes. Residential and commercial/industrial development comprise 5.66% of the land cover, primarily in and around the towns of Leavenworth, Lansing, Tonganoxie, Basehor, Linwood, and Easton. Woodlands are typically clustered along the many streams and creeks that traverse through the county. The principle varieties of native timber include oak, cedar, cottonwood, elm, hackberry, box elder, maple, hickory, red-bud, sycamore, and walnut.

History

William G. Cutler’s History of Kansas, first published in 1883, tells about the history of Leavenworth County.

The first European-Americans to visit the area now known as Leavenworth County were the French traders and explorers traveling up the Missouri River early in the eighteenth century. A Jesuit mission was established on the Missouri river, in what is now Leavenworth County, for the support of "600 lives". This settlement was the first mission to be established in what is now the State of Kansas. By 1757 the Missouri river route to the west was known to the French voyageurs and fleets of boats came down the river each spring laden with furs bought from the Indians at the headwaters.

In March 1827, the Adjutant General's Office in Washington, D.C. ordered Colonel Henry Leavenworth to set up a permanent camp near the junction of the Missouri and Little Platte Rivers. Colonel Leavenworth journeyed up the Missouri River with four companies of infantry. On May 8, 1827, he identified a suitable area for the establishment of a permanent camp. While waiting for official site confirmation, he started a tent camp. Small log and bark huts soon followed, built along what is now Scott Avenue, south of the Post Chapel. Permanent construction began around the Main Parade Area the following year. In September 1827, the site was approved and called Cantonment Leavenworth. Eventually renamed Fort Leavenworth, it became one of the most important Army posts west of the Mississippi River. From here a branch of the Oregon Trail led up the steep hills away from the Missouri

River. Large corrals and supply yards for a branch of the Santa Fe Trail sprang up in this area. Numerous traders and wagon trains began their long journeys to the West from this starting point. When the Indian migration began in the 1830s, the post became the center of activities for Indian agents and a stabilizing force in maintaining peace among the tribes.

In 1833 a Methodist mission was established in what is now the northeastern part of Leavenworth County. The following year, the Catholic church set up a manual labor school for the Indians in what is now Kickapoo township. However, the effort failed and the project was abandoned. Outside Fort Leavenworth, the missionaries were the first to locate permanently in the area. In 1844 Maj. Robert Wilson established a trading post in Salt Creek valley, but sold out in 1852.

The Delaware Indian tribe preceded the white settlers to the area. Tonganoxie is named after one of the Delaware Chiefs, and Indian names abound, such as Delaware, and Wallula. By 1845, a regular stage run was being made from Ft. Leavenworth to Ft. Scott through Lawrence. The Tonganoxie stop was made at the Chief's tavern where mail and passengers were accommodated. The lodge and tavern stood north and east of Tonganoxie. It served a dual function as a stage coach stop and trading post and was the beginning of the community of Tonganoxie.

The first white settlers in Leavenworth County who had any legal right to locate within the territory were the farmers who came to cultivate the lands on the military reservation and the missionaries of the immigrant Indians. The pro-slavery residents of Platte and other Missouri counties, who favored the establishment of slavery in Kansas, knew of the rich and valuable land held by the Indians just across the line and only waited for its cession to come in and take claims. When the treaties were made they did not wait to learn the provisions for the sale of the lands, but rushed across the river and staked out claims. So great was this influx that by the close of June, 1854, there was scarcely any land that had not been claimed by settlers from across the border. The first land claimed after the passage of the Kansas-Nebraska Act, in what is now Leavenworth County, was in the area where the present city of Leavenworth is located. On June 10, 1854, the squatters who had taken claims near the fort in Salt Creek valley held the first "squatter meeting" in the territory. Two squatters' associations - the Leavenworth County and the Kansas-Delaware association - were formed for the purpose of preventing non-residents from taking up land.

Leavenworth County, as it is known today at one time also included the present county of Wyandotte. Leavenworth County was founded in 1855, a year after Leavenworth City (the current county seat) was established, and several years following the establishment of Fort Leavenworth in 1827. The area was settled primarily by the Freestaters who did not believe in slavery. Of course, its proximity to the Missouri river and the state of Missouri, a slave holding state, generated much controversy and in some cases bloodshed.

During the Civil War era, Leavenworth County was embroiled in the conflict between the pro-slavery element in the neighboring State of Missouri and the free-state support within Kansas.

In 1863, the legislature passed an act to erect the Kansas State Penitentiary on a site which is now located within the City of Lansing. The contract to build the prison was let in 1863 and work started in 1864. However, because of funding limitations arising from financing the Civil War, work stopped in 1864 and did not resume again until 1866. The building was first occupied in 1868.

## 3.2 Government

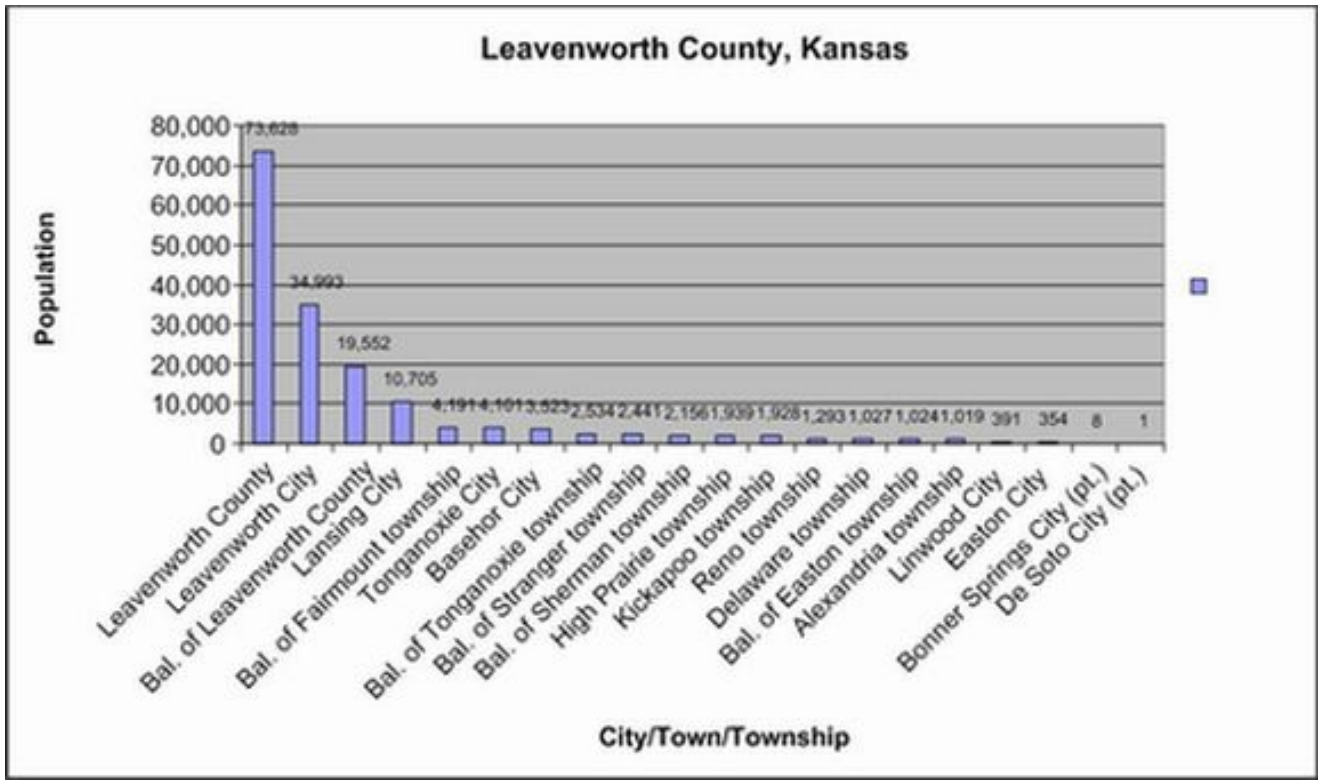
Leavenworth County consists of a representative three member commission. There are a total of seven incorporated jurisdictions within the boundaries of the county, each having a mayoral or mayor/city council/commission form of government.

## 3.3 Demographics

Leavenworth County is a semi-urban county located just north of the greater Kansas City metropolitan area. Leavenworth County's retail trade pull factor of 0.602% in central Kansas for the year 2006 was ranked eighth in Region I. The Leavenworth County Economic Development Council is actively seeking ways to increase expansion of its existing businesses and industries in the county in an attempt to broaden the tax base while not destroying the agricultural base of the county. From a production basis, agricultural products (crops and livestock) comprise the majority of industry in the region.

Leavenworth County is one of the states mid-sized counties in terms of total land area. Leavenworth County's population of 73,628 (U.S. Estimated Pop. 2006) ranked 6th out of 105 counties in the state. Most of these residents are dispersed throughout the county's main population centers, with some smaller concentrations residing in rural parts of the county. The average population density for the entire county is 159 people per square mile of land.

REGIONAL POPULATIONS IN LEAVENWORTH COUNTY (Certified to the Secretary of State-7-1-07)




Leavenworth County is experiencing an overall population gain, which has been steadily increasing since 1940. The recent U.S. Estimated Population for 2006 was 73,628, revealing an increase of 6.8% since the 2000 census. The historical census population counts for Leavenworth County for 1900-2000 are shown in Table 3.3.(1).

## TABLE 3.3 (1) HISTORICAL POPULATION

TABLE 3.3 (1) HISTORICAL POPULATION

| 1900 | 1910 | 1920 | 1930 | 1940 | 1950 | 1960 |
|---|---|---|---|---|---|---|
| 40940 | 41207 | 38402 | 42673 | 41112 | 42361 | 48524 |
| 1970 | 1980 | 1990 | 2000 | 2006 (est.) | % Change | |
| 53340 | 54809 | 64371 | 68691 | 73628 | 7.19% | |

General demographic information from the 2000 Census is shown in Table 3.3 (2). Leavenworth County's Census population was 68,691, with 35,420 people living in Leavenworth, the largest populated city in the county. 46.8% of the people are female and 53.2% male. The median age is 35.6 years. The majority of the population are in the 35-44-year range. 90.2% of the population is under the age of 65. Of the houses in the county, 67% were owner occupied.

## TABLE 3.3 (2) POPULATION DEMOGRAPHICS

TABLE 3.3 (2) POPULATION DEMOGRAPHICS

| Subject | Number | Percent |
|---|---|---|
| Total Population | 68691 | 100.0% |
| Male | 36521 | 53.2% |
| Female | 32170 | 46.8% |
| Under 5 Year | 4775 | 7.0% |
| 5 to 9 Years | 5148 | 7.5% |
| 10 to 14 Years | 5303 | 7.7% |
| 15 to 19 Years | 4914 | 7.2% |
| 20 to 24 Years | 3856 | 5.6% |
| 25 to 34 Years | 9467 | 13.8% |
| 35 to 44 Years | 13235 | 19.3% |
| 45 to 54 Years | 9659 | 14.1% |
| 55 to 59 Years | 3152 | 4.6% |
| 60 to 64 Years | 2416 | 3.5% |
| 65 to 74 Years | 3643 | 5.3% |
| 75 to 84 Years | 2313 | 3.4% |
| 85 Years and Over | 810 | 1.2% |
| Median Age (years) | 36 | |
| 18 Years and Over | 50357 | 73.3% |
| Male | 27142 | 39.5% |
| Female | 23215 | 33.8% |
| 21 Years and Over | 47782 | 69.6% |
| 62 Years and Over | 8146 | 11.9% |
| 65 Years and Over | 6766 | 9.8% |
| Male | 2886 | 4.2% |
| Female | 3880 | 5.6% |

# 3.4 Economy

### Overview

In 2007 Leavenworth had a per capita personal income (PCPI) of $31,097. This PCPI ranked 45th in the state and was 85 percent of the state average, $36,525, and 81 percent of the national average, $38,615. The 2007 PCPI reflected an increase of 2.8 percent from 2006.

The 2006-2007 state change was 5.8 percent and the national change was 4.9 percent. In 1997 the PCPI of Leavenworth was $20,345 and ranked 61st in the state. The 1997-2007 average annual growth rate of PCPI was 4.3 percent. The average annual growth rate for the state was 4.3 percent and for the nation was 4.3 percent. (Bureau of Economic Analysis).

In 2007 Leavenworth had a total personal income (TPI) of $2,285,843. This TPI ranked 7th in the state and accounted for 2.3 percent of the state total. In 1997 the TPI of Leavenworth was $1,385,040 and ranked 7th in the state. The 2007 TPI reflected an increase of 4.2 percent from 2006. The 2006-2007 state change was 6.6 percent and the national change was 6.0 percent. The 1997-2007 average annual growth rate of TPI was 5.1 percent. The average annual growth rate for the state was 4.8 percent and for the nation was 5.4 percent

Total personal income includes net earnings by place of residence; dividends, interest, and rent; and personal current transfer receipts received by the residents of Leavenworth. In 2007 net earnings accounted for 72.1 percent of TPI (compared with 70.6 in 1997); dividends, interest, and rent were 13.9 percent (compared with 17.6 in 1997); and personal current transfer receipts were 14.1 percent (compared with 11.8 in 1997). From 2006 to 2007 net earnings increased 3.5 percent; dividends, interest, and rent increased 5.0 percent; and personal current transfer receipts increased 6.6 percent. From 1997 to 2007 net earnings increased on average 5.4 percent each year; dividends, interest, and rent increased on average 2.7 percent; and personal current transfer receipts increased on average 7.0 percent.

### Agriculture

Farming in Leavenworth County remains the mainstay for the county. The 2006 U.S. Census of Agriculture indicates 1,090 farms, ranking 7th in the State, and 200,000 acres of land in farms, ranking 102nd in the State. Leavenworth County ranks 92nd in farm value of crops harvested ($18,109,500), and 86th in the value of cattle and milk production in the state ($9,803,700). Crops consist of wheat (165,000 bushels), corn (1,464,300 bushels), sorghum (94,700 bushels), and soybeans (1,076,000 bushels). Cattle and calve inventory in January 2007 was 25,200 head valued at $21,170,000. Data for hogs, sheep, and poultry were not available at the county level. Employment statistics for the county show an increase in farm employment from 1,306 in 1990 to 1,376 in the year 2003.

### Business & Industry

During the year 2000, 62.3% of Leavenworth County’s population was in the labor force while 1.9% were unemployed and looking for work. The top employment Sectors includes; Education, Health, and Social Services Sector (22.5%), followed by the Retail Trade Sector (11.3%), then Public Administration (9.9%).

In 2000, 69.8% of the working class was identified by the U.S. Census Bureau as private wage and salary workers; 6.2% as self-employed, and 23.6% as government workers.

In 2007, the unemployment rate in Leavenworth County was 5.1%, ranking the county 7th in the state for unemployment. This percentage was down from 5.5% in 2006 (United States Department of Agriculture).

Leavenworth County Property was valued at $561,858,490 in 2007. Public utility property accounted for 6.55% of the total property valuation, with agricultural land accounting for 1.25% of the total property valuation. Residential property accounted for 71.08% of the total property valuation, and oil and gas properties accounted for 0.20% of the total property valuation.

Approximately 7,000 jobs were added in the county during the period 1990 to 2003. Many of the added jobs were higher income level professionals such as finance, insurance, and real estate. The civilian labor force in Leavenworth County has grown from 25,594 in 1990 to 32,792 in 2004. Table 3.4 (1) shows the 2000 US Census data on Leavenworth County’s workforce.

## TABLE 3.4 (1) LEAVENWORTH COUNTY WORKFORCE BY INDUSTRY (2000)

TABLE 3.4 (1) LEAVENWORTH COUNTY WORKFORCE BY INDUSTRY (2000)

| Industry | Number | Percent |
|---|---|---|
| Agriculture, forestry, fishing and hunting, and mining | 369 | 1.3% |
| Construction | 2530 | 8.7% |
| Manufacturing | 2486 | 8.5% |
| Wholesale trade | 744 | 2.5% |
| Retail trade | 3296 | 11.3% |
| Transportation and warehousing, and utilities | 1948 | 6.7% |
| Information | 1092 | 3.7% |
| Finance, insurance, real estate, and rental and leasing | 1895 | 6.5% |
| Professional, scientific, management, administrative, and waste management services | 2328 | 8.0% |
| Educational, health and social services | 6554 | 22.5% |
| Arts, entertainment, recreation, accommodation and food services | 1803 | 6.2% |
| Other services (except public administration) | 1242 | 4.3% |
| Public administration | 2891 | 9.9% |
| Employment | Number | Percent |
| Population 16 years and over | 52378 | 100.0% |
| In labor force | 32624 | 62.3% |
| Civilian labor force | 30194 | 57.6% |
| Employed | 29178 | 55.7% |
| Unemployed | 1016 | 1.9% |
| Percent of civilian labor force | 3 | |
| Armed Forces | 2430 | 4.6% |
| Not in labor force | 19754 | 37.7% |

### Economic Summary

Leavenworth County's overall increasing population makes economic development somewhat easier than in other areas in the state, as the county is located close to a major metropolitan area for direct access to major services. Additionally, Leavenworth County is classified as a semi-urban county, thus is not considered "distressed" by the State of Kansas. A discussion of this classification is provided below.

The Kansas Department of Health and Environment (KDHE) classifies counties into one of five tiers: Frontier, Rural, Densely-settled rural, Semi-urban, and Urban. The classifications are based on several factors including population per square mile. Since the 1930's, Frontier/Rural contraction has been a

reality for the State. Frontier classification obviously represents the most economically disadvantaged and Urban the most prosperous. A Frontier County is defined as those with less than 6.0 persons per square mile; Rural counties are those with 6.0 – 19.0 persons per square mile. Frontier and Rural are considered "distressed" based on various economic and demographic characteristics.

Distressed counties (Frontier and Rural) account for 68 of the 105 counties in the State. Numerous bills have been introduced into the Kansas legislature over the past ten years, but none have passed that specifically addresses dwendling populations in the rural counties. Other suggestions have included replacing irrigation-based agriculture with more diverse forms of economic activity. Ultimately, the availability of steady, well-paying jobs and affordable housing would mitigate many of the problems created by sparse population.

## 3.5 Climate

Leavenworth County's climate is characterized by hot, humid summers with temperatures occasionally climbing above 90 degrees Fahrenheit and moderate to cold winters with temperatures averaging 20 degrees Fahrenheit. Weather averages are provided in Table 3.5 (1).

### TABLE 3.5 (1) CLIMATE SUMMARY

TABLE 3.5 (1) CLIMATE SUMMARY

| | |
|---|---|
| Average Daily Temperature (Fahrenheit) | 53.4 |
| January (Fahrenheit) | High – 38.0 |
| | Low - 18.1 |
| July (Fahrenheit) | High – 90.0 |
| | Low - 67.6 |
| Average Annual Precipitation (inches) | 38.5 |
| Average Annual Snowfall (inches) | 14.8 |
| Prevailing Winds | Warm Months (Late Spring-Summer) S-SW |
| | Cold Months (Late Autumn-Winter) N-NW |

## 3.6 Natural, Historic, and Cultural Resources

Leavenworth County is blessed with bountiful natural resources, which make the county a haven for naturalists and outdoorsmen. Although Leavenworth County does not have any National Wildlife Refuges, there are fishing and wildlife areas, open lands, and miles of trails and back roads that provide opportunities for unmatched outdoor experiences such as biking, water recreation, freshwater fishing, bird watching, and hunting, to name a few. For the most part, the southern border of Leavenworth County follows the winding course of the Kansas River. The Missouri River forms the northeastern border of Leavenworth County. The Stranger Creek basin spans nearly all of Leavenworth County and generally runs from north to south.

The area's most abundant natural resource may arguably be the agricultural land. The area experiences approximately 38.5 inches of rainfall on an annual basis. The quality of soil and suitable drainage makes it possible to produce a variety of crops. Corn, sorghum, soybeans, and wheat make up the majority of crops in the county. The total number of cropland harvested in 2006 was 95,200 acres.

The Leavenworth State Fishing Lake is the largest and most significant manmade ecological resource in the county. It consists of 160 acres of water, primitive campgrounds, boat ramps, and picnic areas. The

lake is located 3 miles north and 22 miles west of Kansas City: 39.1221 latitude, -95.1603 longitude. The Kansas Department of Wildlife and Parks is responsible for the management of the lake. Additionally, there are eight other lakes in the county and include: Flinner Lake, Happy Hollow Lake, Lake Jeanette, Lake Stellamaris, Merrit Lake, Smith Lake, Valley Lakes, and Yllier Lake.

Gas and Oil

The most recent (complete) report on the total quantity of oil pumped in Leavenworth County was 2008, when 199 wells produced 3,040,005 barrels of crude oil. Review of the Kansas Geological Survey oil and gas well database indicated that 141 oil wells are currently in production in Leavenworth County (2009), with incomplete production data showing 3,046,317 barrels produced. Gas production in 2008 came from 81 wells that produced 73,801 mcf of natural gas.

### Historic Sites in Leavenworth County, Kansas

There are 35 sites in Leavenworth County listed on the National Register of Historic Sites. The sites are presented in Table 3.6 (1).

## TABLE 3.6 (1) COUNTY HISTORIC SITES

TABLE 3.6 (1) COUNTY HISTORIC SITES

| Site Name | Address | City |
|---|---|---|
| Abernathy Furniture Company Factory (added 2004 - Building - #04001142) | 200-210 Seneca St. | Leavenworth |
| Angell, A. J., House (added 1977 - Building - #77000586) | 714 S. Broadway | Leavenworth |
| Arch Street Historic District (added 2002 - District - #02000718) | Roughly bounded by Arch, Pine, S. Second and S. Third Sts. | Leavenworth |
| Atchison, Topeka and Santa Fe Railroad Passenger Depot ** (added 1986 - Building - #86001321) | 781 Shawnee St. | Leavenworth |
| Begley Bridge ** (added 2003 - Structure - #03000373) | Two unnamed farm rds flanking Stranger Creek 1.1 mi. W of jct with 227th St. and Roe Rd., 1.75 mi. NW of Millwood | Millwood |
| Biehler Barn ** (added 1999 - Building - #77000585) | 2.5 mi. N of Easton | Eastern |
| Brewer, David J., House ** (added 1972 - Building - #72000508) | 403 5th Ave. | Leavenworth |
| Burt, Nathaniel H., House (added 1987 - Building - #87001105) | 400 Fifth Ave. | Leavenworth |
| Carroll, Edward, House (added 1986 - Building - #86002806) | 334 Fifth Ave. | Leavenworth |
| Evans Site ** (added 2004 - Site - #04001190) | Address Restricted | Tonganoxie |
| Fort Leavenworth *** (added 1966 - District - #66000346) | Fort Leavenworth Military Reservation | Leavenworth |
| Fort Leavenworth National Cemetery *** (added 1999 - Site - #99000834) | Within Fort Leavenworth military reservation | Fort Leavenworth |
| Harris, Senator William A., House *** (added 1974 - Building - #74000841) | NW of Linwood on KS 32 | Linwood |
| Harvey, Fred, House *** (added 1972 - Building - #72000510) | 624 Olive St. | Leavenworth |
| Hollywood Theater (added 1990 - Building - #90001575) | 401 Delaware St. | Leavenworth |
| Hund School (added 2000 - Building - #00000158) | 31874 179th St. | Leavenworth |
| Insley, Merritt, House and Outbuildings (added 1986 - Building - #86002801) | 602 Seneca St. | Leavenworth |

| | | |
|---|---|---|
| Lansing Man Archeological Site *** (added 1971 - Site - #71000316) | Address Restricted | Lansing |
| Leavenworth County Courthouse ** (added 2002 - Building - #02000394) | 300 Walnut St. | Leavenworth |
| Leavenworth Downtown Historic District (added 2002 - District - #02000389) | Roughly Cheokee St., Delaware St., S. Fifth St., and Shawnee St | Leavenworth |
| Leavenworth Historic Industrial District (added 2002 - District - #02000406) | Roughly Third St. Choctaw St., Second St. and Cherokee St. | Leavenworth |
| Leavenworth Public Library ** (added 1986 - Building - #86002010) | 601 S. Fifth St. | Leavenworth |
| North Broadway Historic District (added 2002 - District - #02000719) | Along N. Broadway bet. Seneca and Ottawa Sts. | Leavenworth |
| North Esplanade Historic District (added 1977 - District - #77000587) | 203--515 N. Esplanade | Leavenworth |
| Old Union Depot (added 1982 - Building - #82002663) | 123 N. Esplanade | Leavenworth |
| Powers, David W., House ** (added 1977 - Building - #77000588) | 2 mi. NW of Leavenworth off U.S. 73 | Leavenworth |
| Quarry Creek Archeological Site ** (added 1973 - Site - #73000761) | Address Restricted | Leavenworth |
| Scott Site ** (added 2004 - Site - #04001189) | Address Restricted | Tonganoxie |
| South Esplanade Historic District (added 2002 - District - #02000720) | Roughly bounded by Arch, Olive and S. Second Sts and RR | Leavenworth |
| Third Avenue Historic District (added 2002 - District - #02000721) | Roughly bounded by 2nd and Aves. and Congress and Middle Sts | Leavenworth |
| Union Park Historic District (added 2002 - District - #02000722) | Roughly bounded by Chestnut, Congress, S. 6th and W. 7th Sts. | Leavenworth |
| Western Branch, National Home for Disabled Volunteer Soldiers *** (added 1999 - District - #99000456) | US 73 | Leavenworth |
| Western Branch, National Home for Disabled Volunteer Soldiers Historic District (added 1994 - District - #94000671) | Roughly bounded by US 73, Missouri Pacific Railroad and Missouri R., Limit St. and KS 5 | Leavenworth |
| Zacharias Site (14LV380) *** | Address Restricted | Leavenworth |

| | | |
|---|---|---|
| (added 1987 - Site - #86003517) | | |
| AXA Building ** (added 1972 - Building - #72000509) | 205 S. 5th St. | Leavenworth |

# 3.7 Geologic Features

### Topography and drainage

Leavenworth County lies entirely within the Glaciated Region of the Central Lowlands physiographic province. The major topographic features are the Missouri River Valley in the northeast corner of the county, east-trending Kansas River Valley in the extreme southern portion of the county, and the upland cuestas formed by differential erosion of the limestone, shale, and sandstone beds. The glaciated region is characterized by rolling hills (some formed from thick glacial loess deposits) and scattered deposits of rocks and boulders transported from other geographic areas as glacial debris.

The Kansas River and its tributaries drain the southern end of the county. The Stranger Creek basin is the most significant of these tributaries and drains nearly the entire county from north to south. The Missouri River and its tributaries drain the northeastern corner of Leavenworth County. The highest point in the county is in the north-western corner, ~1,550 feet above sea level; the lowest point is found along the southern and eastern edges of the county in the Kansas and Missouri River bottoms, ~680 feet above mean sea level. (Kansas Geological Survey).

Leavenworth County lies within four river basins including: the Missouri River Drainage Basin, Lower Kansas River Drainage Basin, Lower Republican River Drainage Basin, and the Independence/Sugar Creek River Drainage Basin.

### Rivers, lakes, streams

Leavenworth County has two of its borders formed by rivers. The southern boundary is created by the Kansas River and represents the border with Douglas County. Along the eastern boundary, the Missouri river creates the boundary between Leavenworth County and the state of Missouri (Kansas Geological Survey).

Leavenworth County is home to nine lakes including: Lake Jeanette, Jerry's Lake, Happy Hollow Lake, Lake Stellamaris, Merritt Lake, Smith Lake, Leavenworth State Fishing Lake, Valley Lakes, and Yllier Lake.

The Leavenworth County State Lake is located approximately three miles northwest of Tonganoxie. It consists of 160 acres of water, primitive campgrounds, boat ramps, and picnic areas. The lake is located three miles north and 22 miles west of Kansas City: 39.1221 latitude, -95.1603 longitude. The Forestry, Fish and Game Commission of Kansas purchased original portions of the land in 1929. According to the Kansas Department of Wildlife and Parks the last acquisition of land in 1930 completed the property to its current size. Construction of the lake began in 1930, and the area was opened to fishing and hunting in 1932. The lake consists of 501 acres of land and is maintained by the Kansas Department of Wildlife and Parks.

A total of 34 streams and creeks criss-cross the county and include Branch Creek, Brush Creek, Buckhorn Creek, Buttermilk Creek, Corral Creek, Cow Creek, Cramer Creek, Dawson Creek, Fall Creek, Fivemile Creek, Island Creek, Jarbalo Creek, Little Plum Creek, Little Sandy Creek, Little Snell Creek, Little Stranger Creek, Mud Creek, Murray Creek, Ninemile Creek (Leavenworth), Ninemile Creek (Tonganoxie), Piper Creek, Plum Creek, Pony Creek, Prairie Creek, Quarry Creek, Rock Creek, Salt Creek, Sevenmile Creek, South Fork Fall Creek, Stranger Creek, Threemile Creek, Tonganoxie Creek, Walnut Creek, West Brush Creek.

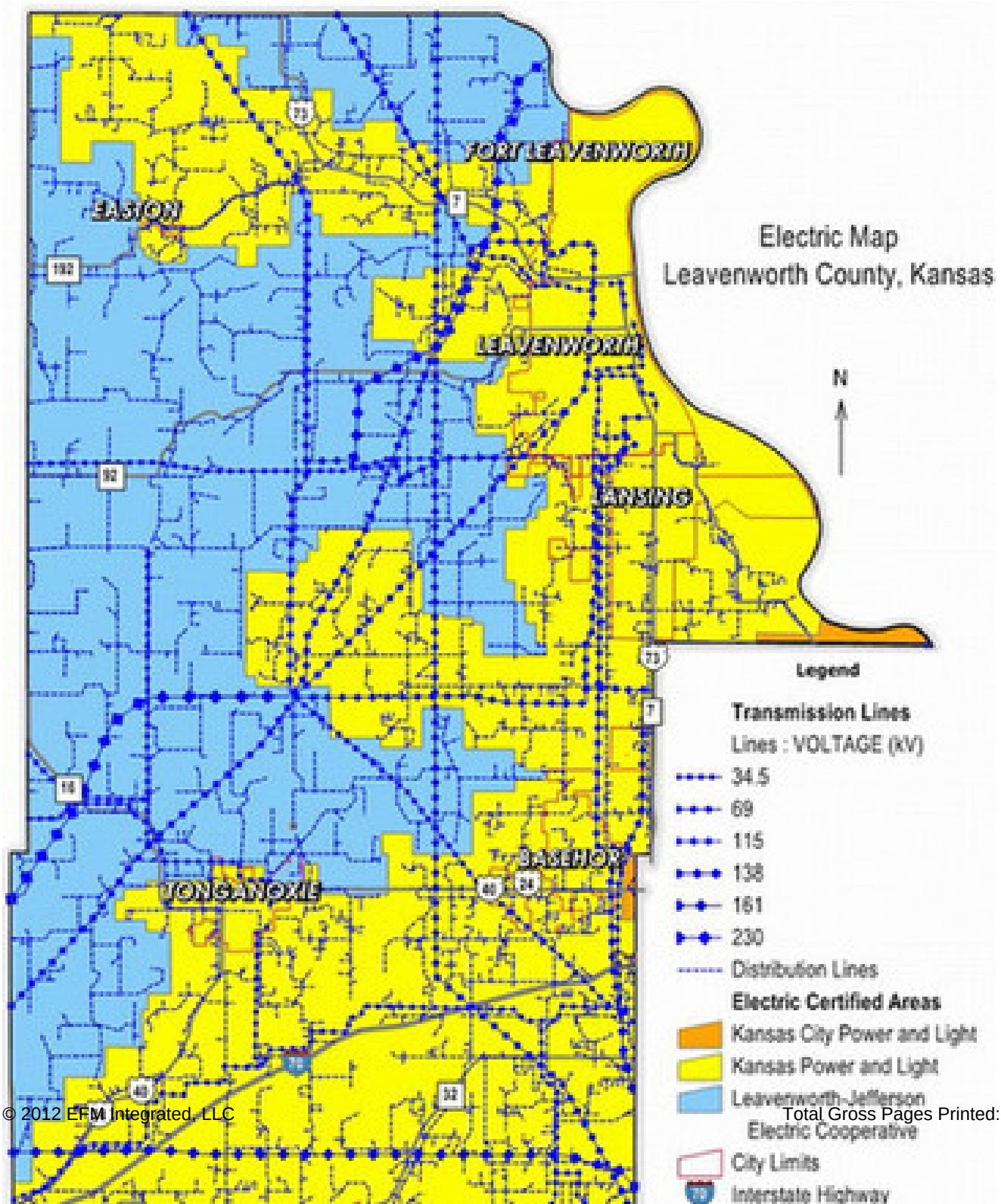
Several other unnamed dammed impoundments are located throughout Leavenworth County in various locations and for the most part are formed by tributaries of creeks and streams. These impoundments are utilized in the aid of irrigation for farmland/pastureland.

# 3.8 Utilities and Transportation

## 3.8.1 Electricity

Utility providers in the county include Leavenworth-Jefferson Electric COOP and Westar Energy Corp.

Leavenworth County Electric Map

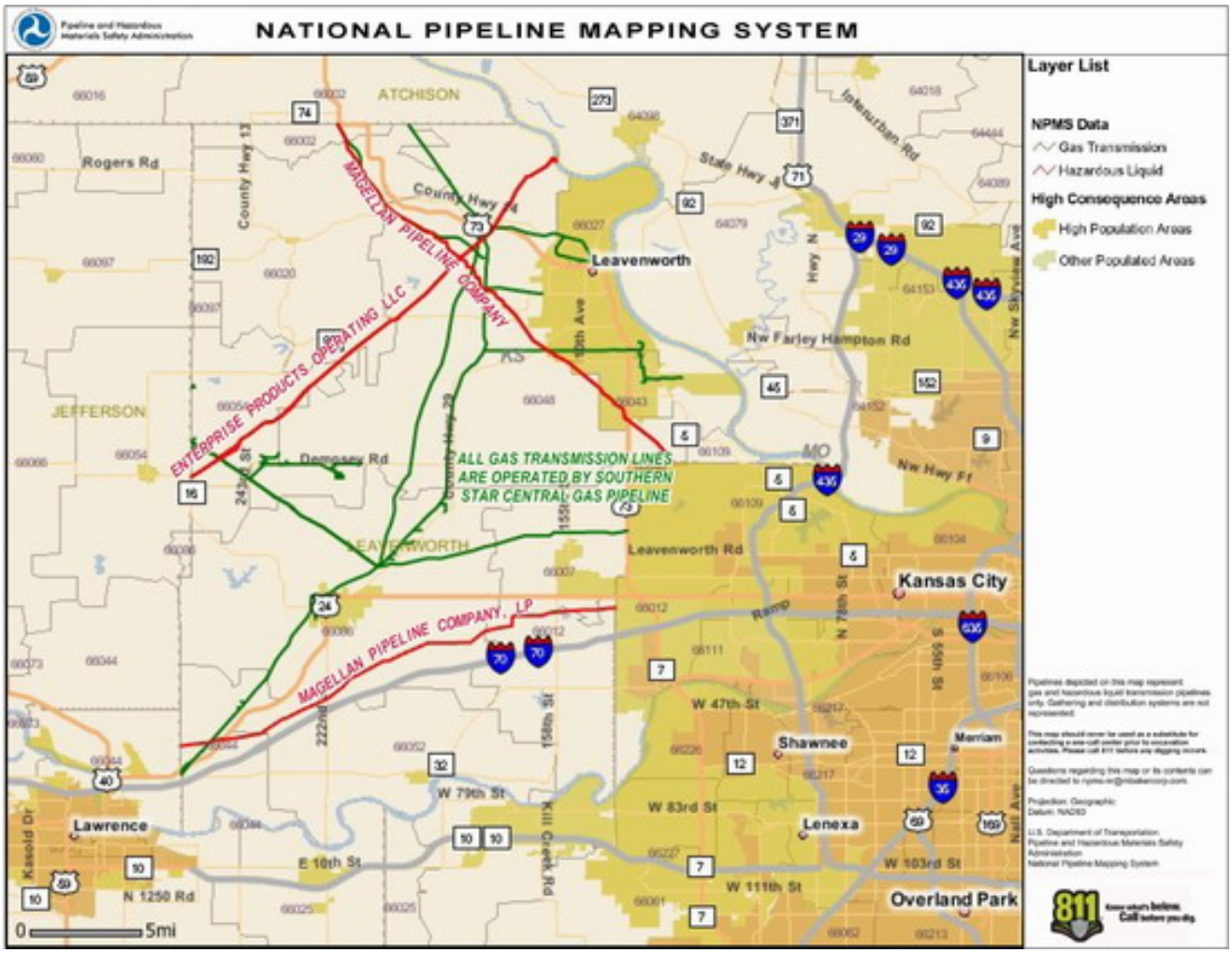


### 3.8.2 Natural Gas

Natural gas is provided by the Kansas Gas Service, Southern Star, and Atmos.

The National Pipeline Mapping System provides a comprehensive cartographic reference of pipeline sources. Pipeline systems transporting natural gas and hazardous liquid pass through Leavenworth County. The pipeline operators within Leavenworth County include Enterprise Products Operating LLC, Magellan Pipeline Co., Midwest Grain Pipeline, and Southern Star Central Gas Pipeline, Inc.

Leavenworth County Pipeline Map




### 3.8.3 Water

The Leavenworth Water Department provides water for the Lan Del Water District (includes Lansing) and six rural water districts surrounding the city of Leavenworth. (www.lvnwater.com) Water systems in the county include the City of Easton, Fort Leavenworth American Water Ent. Inc., Lan Del Water District, Lansing Correctional Facility, Leavenworth CO Cons RWD 1, Leavenworth CO RWD 1, Leavenworth CO RWD 10, Leavenworth CO RWD 2, Leavenworth CO RWD 5, Leavenworth CO RWD 6, Leavenworth CO RWD 7, Leavenworth CO RWD 8, Leavenworth CO RWD 9, Leavenworth Water Dept., City of Linwood, Paradise Park mobile home court, Public wholesale WSD 6, Suburban Water Co., the City of Tonganoxie, and Heartland Community Church.

Water treatment plants are operated by the Lansing Correctional Facility, City of Lansing, City of Leavenworth, City of Tonganoxie, and Leavenworth WaterWorks (Kansteiner Plant), Easton, Linwood,

and Basehor as well as Fort Leavenworth and the US Federal Penitentiary.

### 3.8.4 Telecommunications

The two main providers of telecommunications for Leavenworth County are Sprint and AT&T.

### 3.8.5 Transportation

Federal: Three Federal highways traverse Leavenworth County. U.S. Highway 73 enters the county from the north, and trends south through the cities of Leavenworth and Lansing. U.S. 73 exits into Wyandotte County. The estimated total mileage for this highway in Leavenworth County is 20.923 miles.

U.S. 24 enters the county from the southwest, and trends northeast through Tonganoxie and Basehor. The estimated mileage for this Leavenworth County highway is 19.718 miles.

Interstate 70 enters the county from the southwest and trends northeast. The total estimated mileage for this highway in Leavenworth County is 16.568 miles.

State: There are four state highways in Leavenworth County. K16 enters the county from the west and trends southeast into Tonganoxie. The estimated mileage for this roadway in Leavenworth County is 8.434 miles.

K32 enters the county from the southwest and trends west. K32 passes through Linwood and exits into Wyandotte County. The estimated mileage for this Leavenworth County highway is 17.009 miles.

K92 enters the county from the west and runs east until it merges with U.S. 73 in Leavenworth. It runs again for less than a mile before exiting into Missouri. The estimated mileage for this roadway in Leavenworth County is 17.241 miles.

K192 enters the county from the west and trends northeast before merging into U.S. 73. The estimated mileage of this highway in Leavenworth County is 8.51 miles.

The total estimated mileage for state and federal roadways in Leavenworth county is 108.403 miles. The estimated mileage of other county roads is 895.397 miles. Total road mileage in the county is estimated at 1003.8 miles.

Numerous other secondary paved and unpaved roads crisscross the county in one-mile sections. Hazardous chemical, agricultural, and petroleum industry transporters use these routes on a periodic basis. The estimated total mileage for rural county roads in Leavenworth County is 452 miles.

The total estimated mileage for federal, state, and county roads combined for Leavenworth County is 1,455.8 miles.

Leavenworth County Transportation Map

### Other Modes of Transportation

Railroad

The Union Pacific railroad operates two main routes in Leavenworth County. One line runs northwest to southeast along the Missouri River in the northeast portion of the county. This route passes through or nearby the communities of Lansing, Leavenworth, and Fort Leavenworth. The other line runs east to west along the Kansas River in the extreme southern portion of the county. This route passes through or nearby the communities of Coldspur, Linwood, and Fall Leaf.

Airports

Six airports (four privately operated, one publicly operated, one military) are registered in Leavenworth County.

Sherman AAF Airport is located ~three miles north of Fort Leavenworth and operated by the military. The runway (15/33) extends 5905 feet and is composed of asphalt/bituminous concrete.

Dwight Eisenhower VA Medical Center Airport is located at the VA Medical Center in Leavenworth. The runway (H1) is a 400 square foot heliport used for transportation of patients and personnel.

Hoelting Airport is located ~two miles southwest of Basehor. The runway (17/35) extends 2100 feet and is likely composed of turf.

Neu Field Airport is located ~three miles northwest of Basehor. The runway (17/35) extends 2000 feet and is likely composed of turf.

Blaser’s Airport is located ~four miles southwest of Leavenworth. The runway (03/21) extends 2300 feet and is likely composed of turf.

Sheller’s Airport is located ~three miles west of Tonganoxie. The runways (04/22 and 18/36) extend 1600 feet and 2000 feet and are likely composed of turf.

## 3.9 Local Jurisdictions

### 3.9.1 City of Leavenworth (Population: 35,420 )

Leavenworth is a semi-urban community, and serves as the county seat. The City of Leavenworth's economy is largely comprised of the educational, health and social services industries; public administration; and retail trade sectors. According to the U.S. Census Bureau (2000) the city has a total area of 23.5 miles.

As of the census of 2000, there were 35,420 people, 12,035 households, and 8,219 families residing in the city. The population density was 1,506.8 people per square mile (581.7/km²). There were 12,936 housing units at an average density of 550.3/sq mi (212.4/km²). The racial makeup of the city was 76.77% White, 16.32% African American, 0.76% Native American, 1.48% Asian, 0.17% Pacific Islander, 1.72% from other races, and 2.78% from two or more races. Hispanic or Latino of any race were 5.08% of the population.

There were 12,035 households out of which 39.1% had children under the age of 18 living with them, 53.0% were married couples living together, 11.6% had a female householder with no husband present, and 31.7% were non-families. 27.1% of all households were made up of individuals and 9.5% had someone living alone who was 65 years of age or older. The average household size was 2.60 and the average family size was 3.19.

In the city the population was spread out with 27.7% under the age of 18, 8.8% from 18 to 24, 34.8% from 25 to 44, 19.0% from 45 to 64, and 9.7% who were 65 years of age or older. The median age was 34 years.

The median income for a household in the city was $40,681, and the median income for a family was $48,836. Males had a median income of $36,953 versus $24,235 for females. The per capita income for the city was $18,785. About 6.8% of families and 9.1% of the population were below the poverty line, including 12.1% of those under age 18 and 10.3% of those age 65 or over. (U.S. Census Bureau)

The General Medical and Surgical Hospitals industry provides a high number of jobs in the area, with estimated 2005 employment of 1,749. Other high employment industries include: Greeting Card Publishers (750 Emp.), and Limited-Service Restaurants (633 Emp.).

The three industries with the greatest number of establishments in the area include: Retail Trade (124 establishments), Construction (94 establishments), and Health Care and Social Assistance (82 establishments).~www.ecanned.com

USD 453 serves Leavenworth. The area has six elementary schools: Anthony Elementary, David Brewer Elementary, Nettie Hartnett/ Ben Day Elementary School, Howard Wilson Elementary, Lawson Elementary, Muncie Elementary, two junior high schools; Richard Warren Middle School and West Middle School, and one high school, Leavenworth High School. USD 453 also has the North Broadway Education Center and the Leavenworth Virtual School. Xavier Elementary (Pre-K-8) and Immaculata High School are private schools located in Leavenworth.

### 3.9.2 City of Lansing (Population: 9,199 )

Lansing is the second most populated city in the county, and is located 5.03 miles south of Leavenworth (county seat). In 2007, Money Magazine named Lansing one of the 100 best places to live. Lansing is a semi-urban city, with its economy largely derived from the retail and services industry, with agriculture a strong component of the economy. Lansing has an area of 8.6 sq. mi., with 0.1 sq. mi. comprised of water.

As of the U.S. Census in 2000, there were 9,199 people, 2,435 households, and 1,913 families residing in the city. The population density was 1,080.1 people per square mile (416.9/km²). There were 2,548 housing units at an average density of 299.2/sq mi (115.5/km²). The racial makeup of the city was 80.95% White, 12.46% Black or African American, 1.22% Native American, 1.33% Asian, 0.15% Pacific Islander, 1.34% from other races, and 2.55% from two or more races. Hispanic or Latino of any race were 3.85% of the population.

There were 2,435 households out of which 42.2% had children under the age of 18 living with them, 65.0% were married couples living together, 9.4% had a female householder with no husband present, and 21.4% were non-families. 18.4% of all households were made up of individuals and 7.1% had someone living alone who was 65 years of age or older. The average household size was 2.79 and the average family size was 3.17.

In the city the population was spread out with 22.0% under the age of 18, 8.8% from 18 to 24, 38.5% from 25 to 44, 23.1% from 45 to 64, and 7.5% who were 65 years of age or older. The median age was 36 years.

The median income for a household in the city was $60,994, and the median income for a family was $65,639. Males had a median income of $36,326 versus $28,315 for females. The per capita income for the city was $21,655. About 1.9% of families and 2.4% of the population were below the poverty line, including 1.5% of those under age 18 and 3.5% of those age 65 or over. (U.S Census Bureau)

The top three industries with the most establishments are Construction (15 Establishments), Administrative and Support and Waste Management and Remediation Services (five Establishments), and Retail Trade (three Establishments).

The three largest industries (by count of 2005 establishments) include: Retail Trade (24 Establishments), Other Services (18 Establishments), and Health Care and Social Assistance (18 Establishments). ~ www.ecanned.com

USD 469 serves the Lansing community and consists of Lansing Elementary School, Lansing Middle School, and Lansing High School.

### 3.9.3 City of Tonganoxie (Population: 2,728 )

Tonganoxie is a semi-urban town located 19.06 miles southwest of Leavenworth (County Seat). The city's economy is largely derived from agriculture. The City of Tonganoxie has an area of 3.1 sq. miles, all of which is land.

As of the census of 2000, there were 2,728 people, 999 households, and 737 families residing in the city. The population density was 869.8 people per square mile (335.4/km²). There were 1,032 housing units at an average density of 329.0/sq mi (126.9/km²). The racial makeup of the city was 95.23% White, 1.17% African American, 0.88% Native American, 0.37% Asian, 0.26% Pacific Islander, 0.66% from other races, and 1.43% from two or more races. Hispanic or Latino of any race were 2.27% of the population.

There were 999 households out of which 42.0% had children under the age of 18 living with them, 57.6% were married couples living together, 11.8% had a female householder with no husband present, and 26.2% were non-families. 22.9% of all households were made up of individuals and 11.6% had someone living alone who was 65 years of age or older. The average household size was 2.65 and the average family size was 3.13.

In the city the population was spread out with 30.0% under the age of 18, 9.5% from 18 to 24, 30.0% from 25 to 44, 17.1% from 45 to 64, and 13.4% who were 65 years of age or older. The median age was 32 years.

The median income for a household in the city was $44,278, and the median income for a family was $49,960. Males had a median income of $37,301 versus $24,028 for females. The per capita income for the city was $18,026. About 4.5% of families and 6.0% of the population were below the poverty line, including 5.5% of those under age 18 and 9.9% of those age 65 or over. (U.S. Census Bureau)

The Supermarkets and Other Grocery (except Convenience) Stores industry provides a high number of jobs in the area, with estimated 2005 employment of 112. Other high employment industries include: Limited-Service Restaurants (98 Emp.), and Mail-Order Houses (89 Emp.).

The top three industries with the most establishments include: Construction (34 Establishments), Retail Trade (21 Establishments), and Other Services (18 Establishments). ~www.ecanned.com

USD 464 serves the Tonganoxie community, which consists of Tonganoxie Elementary School (K-4), Tonganoxie Middle School (5-8), and Tonganoxie High School (9-12).

### 3.9.4 City of Basehor (Population: 2,238)

Basehor is a rural community located 14.47 miles south of Leavenworth, the county seat. Basehor's economy is largely derived from agriculture. The area of the city is 3.1 sq. miles.

As of the census of 2000, there were 2,238 people, 830 households, and 650 families residing in the city. The population density was 712.3 people per square mile (275.2/km²). There were 848 housing units at an average density of 269.9/sq mi (104.3/km²). The racial makeup of the city was 97.14% White, 0.36% African American, 0.31% Native American, 0.71% Asian, 0.04% Pacific Islander, 0.49% from other races, and 0.94% from two or more races. Hispanic or Latino of any race were 1.61% of the population.

There were 830 households out of which 36.3% had children under the age of 18 living with them, 64.5% were married couples living together, 11.1% had a female householder with no husband present, and 21.6% were non-families. 19.3% of all households were made up of individuals and 9.0% had someone living alone who was 65 years of age or older. The average household size was 2.70 and the average family size was 3.09.

In the city the population was spread out with 27.2% under the age of 18, 8.4% from 18 to 24, 28.1% from 25 to 44, 23.8% from 45 to 64, and 12.6% who were 65 years of age or older. The median age was 37 years.

The median income for a household in the city was $52,831, and the median income for a family was $60,000. Males had a median income of $40,540 versus $27,708 for females. The per capita income for the city was $20,731. About 2.8% of families and 4.1% of the population were below the poverty line, including 4.7% of those under age 18 and 6.4% of those age 65 or over. (U.S. Census Bureau)

The three largest industries (by count of 2005 establishments) include: Construction (33 Establishments), Professional, Scientific, and Technical Services (11 Establishments), and Other Services (eight Establishments).

The Highway, Street, and Bridge Construction industry provides the largest number of jobs, with estimated 2005 employment of 175. The next highest industries include: Child Day Care Services (49 Emp.), and Limited-Service Restaurants (35 Emp.). ~www.ecanned.com

Basehor-Linwood USD 458 serves both the communities of Basehor and Linwood. Two elementary schools and one high school are located in Basehor. Middle school students commute to Basehor-Linwood Middle School in Linwood.

### 3.9.5 City of Linwood (Population: 374)

Linwood is a rural community located approximately 28.48 miles southwest of Leavenworth, the county seat. The City of Linwood's economy is largely supported by agriculture, and bolstered by the service industries with employees in contracting and manufacturing. Linwood has an area of 0.4 sq. miles.

As of the census of 2000, there were 374 people, 129 households, and 87 families residing in the city. The population density was 902.0 people per square mile (352.2/km²). There were 146 housing units at an average density of 352.1/sq mi (137.5/km²). The racial makeup of the city was 90.11% White, 0.53% African American, 4.01% from other races, and 5.35% from two or more races. Hispanic or Latino of any race were 7.75% of the population.

There were 129 households out of which 45.0% had children under the age of 18 living with them, 47.3% were married couples living together, 14.0% had a female householder with no husband present, and 31.8% were non-families. 25.6% of all households were made up of individuals and 8.5% had someone living alone who was 65 years of age or older. The average household size was 2.90 and the average family size was 3.50.

In the city the population was spread out with 35.3% under the age of 18, 12.6% from 18 to 24, 29.9% from 25 to 44, 16.8% from 45 to 64, and 5.3% who were 65 years of age or older. The median age was 27 years.

The median income for a household in the city was $35,313, and the median income for a family was $39,125. Males had a median income of $26,875 versus $24,896 for females. The per capita income for the city was $13,008. About 6.1% of families and 7.2% of the population were below the poverty line, including 9.5% of those under age 18 and none of those age 65 or over. (U.S. Census Bureau)

The top three industries with the most establishments are Construction (15 Establishments), Administrative and Support and Waste Management and Remediation Services (five Establishments), and Retail Trade (three Establishments). ~www.ecanned.com

Basehor-Linwood USD 458 serves both the communities of Basehor and Linwood. Located in the town of Linwood are Basehor-Linwood Middle School and Linwood Elementary School. Students from the community of Linwood also commute to Basehor-Linwood High School and the Basehor-Linwood Virtual School, both of which are located in the City of Basehor.

### 3.9.6 City of Easton (Population: 362)

Easton is a rural community located 13.59 miles northwest of Leavenworth, the county seat. The City of Easton's economy is largely derived from agriculture. Although the city of Easton has a relatively small population it is located only 30 miles from the Kansas City Metropolitan Area. According to the United States Census Bureau (2000), the city has a total area of 0.1 square miles (0.4km²), all of it land.

As of the census of 2000, there were 362 people, 117 households, and 87 families residing in the city. The population density was 2,523.5 people per square mile (998.3/km²). There were 138 housing units at an average density of 962.0/sq mi (380.6/km²). The racial makeup of the city was 94.48% White, 1.10% African American, 0.83% Native American, 0.28% Asian, 0.83% from other races, and 2.49% from two or more races. Hispanic or Latino of any race were 1.93% of the population.

There were 117 households out of which 44.4% had children under the age of 18 living with them, 54.7% were married couples living together, 12.0% had a female householder with no husband present, and 24.8% were non-families. 22.2% of all households were made up of individuals and 6.0% had someone living alone who was 65 years of age or older. The average household size was 2.72 and the average family size was 3.16.

In the city the population was spread out with 31.5% under the age of 18, 8.8% from 18 to 24, 25.4% from 25 to 44, 12.7% from 45 to 64, and 21.5% who were 65 years of age or older. The median age was 32 years.

The median income for a household in the city was $26,818, and the median income for a family was $29,000. Males had a median income of $26,625 versus $19,375 for females. The per capita income for the city was $12,751. About 22.1% of families and 18.1% of the population were below the poverty line, including 24.2% of those under age 18 and 4.9% of those age 65 or over. (U.S. Census Bureau)

In terms of total establishments in the area, the top three industries include: Construction (five Establishments), Other Services (three Establishments), and Professional, Scientific, and Technical Services (two Establishments). ~www.ecanned.com

USD 449 serves the city of Easton. Easton has three schools which include Pleasant Ridge Elementary School, Pleasant Ridge Middle School, and Pleasant Ridge High School.

## 3.10 Mitigation Capabilities

This portion of the Plan assesses Leavenworth County’s current capacity to mitigate the effects of the natural hazards identified in Section 4.0. The assessment includes a comprehensive examination of the following local government capabilities:

- Staff & Organizational Capability
- Administrative and Technical Capability
- Policy & Program Capability
- Fiscal Capability
- Legal Authority
- Political Willpower

The purpose of conducting this capabilities assessment is to identify potential hazard mitigation opportunities available to Leavenworth County through its operation as a local government. Careful analysis should detect any existing gaps, shortfalls or weaknesses within existing government activities that could exacerbate jurisdiction vulnerability. The assessment will also highlight the positive measures already in place or being done at the county level, which should continue to be supported and enhanced if possible through future mitigation efforts.

The jurisdictions participating in this multi-jurisdictional plan believe it has the capacity to stand alone

and will, for most situations, execute it as such. In the cases where the jurisdiction indicates a comprehensive plan, or related planning function, this plan will be used or incorporated in to that process as a reference or guiding document. As part of plan maintenance, the yearly review will examine and document the integration of the mitigation plan with other plans and planning functions. This process will also review new opportunities to incorporate and integrate the plan.

The capabilities assessment serves as the foundation for designing an effective hazard mitigation strategy. It not only helps establish the goals and objectives for Leavenworth County to pursue under this plan, but also ensures that those goals and objectives are realistically achievable under given local conditions.

### TABLE 3.10 (1) CAPABILITIES SUMMARY

TABLE 3.10 (1) CAPABILITIES SUMMARY

| | Emergency Coordinator | Emergency Ops Plan | Planning Dept or Planner | Floodplain Manager | Mitigation Officer | Planning Commission | Buidling Codes/Inspection | Zoning Ordinances | NFIP Member | Community Rating System (CRS) | Floodplain Plan per CRS | Stormwater Management Plan | Comprehensive Land Plan | Subdivision Regulation | Economic Development Plan | GIS Capabilities |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Leavenworth (UnInc.) | X | X | X | X | | X | | X | X | | | X | X | X | X | X |
| Basehor | | | X | X | | X | X | X | X | | | | X | X | | X |
| Easton | | | | X | | | | | X | | | | | | | |
| Lansing | | | X | X | | X | X | X | X | | | X | X | X | | X |
| Leavenworth | | | X | X | | X | X | X | X | | | X | X | X | X | X |
| Linwood | | | X | | | X | X | X | X | | | | X | X | | |
| Tonganoxie | | | X | X | | X | X | X | X | | | X | X | X | | |
| University of St. Mary | | | | | | | | | | | | | | | | |
| USD 449 | | | | | | | | | | | | | | | | |
| USD 453 | | | | | | | | | | | | | | | | |
| USD 458 | | | | | | | | | | | | | | | | |
| USD 464 | | | | | | | | | | | | | | | | |
| USD 469 | | | | | | | | | | | | | | | | |

## 3.10.1 Staff and Organizational Capability

Leavenworth County has sufficient staff and organizational resources to implement hazard mitigation strategies. Current growth projections suggest future staff and resources will increase with growth in the County's financial capabilities.

Leavenworth County is served by a full-time three-member elected commission. Commissioners are elected through voter precincts (number of voters determined through district mapping, rather than as representatives of each township). Terms on the board are four-year terms and are staggered with elections held every two years.

The county, and in many cases in coordination and support from local municipalities, has a number of professionally staffed departments and organizations to serve the residents of Leavenworth County and to carry out day-to-day administrative activities. These include the following:

Leavenworth County is responsible for property tax valuation and collection to support the operation of the public school system. Taxes are paid to the state then re-distributed back to the counties based on formula. These funds generally maintain buildings, provide funds for capital projects, and also include paying salaries, purchasing textbooks and supplies.

The County Planning and Zoning Committee is responsible for applicable local codes through a program of inspection and permitting.

The County Commissioners, County Clerk, Treasurer, Register of Deeds, County Attorney, and the Sheriff are elected every four years.

Appointed Positions include: Noxious Weed and Solid Waste Director, Health Department Coordinator, County Coroner, Council on Aging Director, Clerk of District Court, Public Works Director, Juvenile Services Director, Emergency Medical Services Director, Extension Agent, Geographic Information Systems Director, Information Technology Systems Director, Legal Counselor, Emergency Management Coordinator, Planning and Zoning Director, and Probation Director. Functional departments operate on a budget approved annually by the commissioners.

The Leavenworth County Cooperative Extension office seeks to help individuals, families, and communities put research-based knowledge to work to improve their lives. Kansas’s Cooperative Extension is based at Kansas's land grant institution, Kansas State University, but offices are located in all 105 counties in the State.

The Leavenworth County Public Health Department seeks to help individuals, families, and communities put research-based knowledge to work to improve their lives.

The Emergency Management office is responsible for the mitigation, preparedness, response and recovery operations that deal with both natural and man-made disaster events. The formation of an emergency management department in each county is mandated under Kansas General Statutes.

The Treasurer is responsible for the oversight and management of the County’s budget and fiscal programs, including the administration of state and federal grants.

Of the above-listed county departments, the following are actively involved in mitigation activities or hazard control tasks: Emergency Management, County Clerk, Appraiser, Planning and Zoning Department, Health Department, Extension Office, and the Board of County Commissioners. Each of these departments have been involved in the hazard analysis and development of mitigation planning for the county in order to identify gaps, weaknesses or opportunities for enhancement of potential mitigation programs.

For the most part, it was determined that each of these departments are staffed, trained, and funded to accomplish their day-to-day missions. However, staff identified the need for expanded Information Technology capability to enhance Countywide-planning capabilities. This need is further defined in the mitigation actions.

City Government

All incorporated cities within Leavenworth County have limited staff and organizational resources to implement hazard mitigation strategies.

The City of Leavenworth has a five-member City Commission, whose members are elected at-large. Two members (most popular elected) serve four years and the remaining members serve two-year terms, all of which are staggered with elections held every two years. The City of Leavenworth also has a City

Manager.

The Cities of Tonganoxie and Basehor have five-member City Councils and mayor. Council members are elected at-large, and serve on the board for four-year terms, which are staggered with elections held every two years. Tonganoxie also has a City Administrator.

The City of Linwood has a four-member City Council. Council members are elected at-large, and serve on the board for four-year terms, which are staggered with elections held every two years.

The City of Lansing has a four-member City Council and mayor, elected by dedicated area. Council members serve on the board for four-year terms, which are staggered with elections held every two years. Lansing also has a City Administrator.

The City of Easton has a five-member City Council and mayor. Council members are elected at-large, and serve on the board for two year terms.

Unified School Districts

The Boards of Education for USDs 449, 453, 458, 464, and 469 are responsible for the operation of the county school systems, and are also elected at large by the people.

St. Mary University is privately funded and sponsored by the Sisters of Charity of Leavenworth, Kansas, with operations managed by a Board of Trustees, and University Administrators.

## 3.10.2 Legal and Regulatory Capability

In implementing a mitigation plan or specific action, a local jurisdiction may utilize any or all of the four broad types of government authority granted by the State of Kansas. The four types are defined as: (a) Regulation, (b) Acquisition, (c) Taxation, (d) Spending.

The scope of this local authority is subject to constraints, however, as all of Kansas' political subdivisions must not act without proper delegation from the State. Under a principle known as "Dillon's Rule," all power is vested in the State and can only be exercised by local governments to the extent it is delegated. Thus, this portion of the capabilities assessment will summarize Kansas' enabling legislation which grants the four types of government powers listed above within the context of available hazard mitigation tools and techniques.

### Regulation

### General Police Power

Kansas' local governments have been granted broad regulatory powers in their jurisdictions. Kansas General Statutes (K.A.R.) bestow the general police power on local governments, allowing them to enact and enforce ordinances which define, prohibit, regulate or abate acts, omissions, or conditions detrimental to the health, safety, and welfare of the people, and to define and abate nuisances (including public health nuisances).

Since hazard mitigation can be included under the police power (as protection of public health, safety and welfare), towns, cities, and counties may include requirements for hazard mitigation in local ordinances. Local governments may also use their ordinance-making power to abate "nuisances," which could include, by local definition, any activity or condition making people or property more vulnerable to any hazard.

*Leavenworth County and the incorporated cities have enacted and enforce regulatory ordinances designed to promote the public health, safety and general welfare of its citizenry. These ordinances are discussed in this Section.*

### Building Codes and Building Inspection

Many structural mitigation measures involve constructing and retrofitting homes, businesses and other structures according to standards designed to make the buildings more resilient to the impacts of natural hazards. Many of these standards are imposed through the building code.

Kansas does not have state mandatory building codes. However, municipalities and counties may adopt codes for their respective areas if approved by the state as providing "adequate minimum standards".

Local governments in Kansas are also empowered to carry out building inspections, and may empower cities and counties to create an inspection department to enforce construction codes and ordinances.

Regulatory powers granted by the state to local governments are the most basic manner in which a local government can control the use of land within its jurisdiction. Through various land use regulatory powers, a local government can control the amount, timing, density, quality, and location of new development. All these characteristics of growth can determine the level of vulnerability of the community in the event of a natural hazard. Land use regulatory powers include the power to engage in planning, enacting and enforcing zoning ordinances, floodplain ordinances, and subdivision controls. Each local community possesses great power to prevent unsuitable development in hazard-prone areas.

*Leavenworth County has not adopted any building and inspection codes for the unincorporated areas of the County. The City of Easton has not adopted any building and inspection codes for the community. The City of Basehor has adopted applicable building codes with the exception of 2002 Electric. The City of Lansing has adopted the 2003 International Residential Code (IRC), 2003 International Building Code (IBC), 2003 International Mechanical Code (IMC), 2003 International Plumbing Code (IPC), and 2002 International Electrotechnical Commission (IEC) building codes for their community. The City of Lansing utilizes life-safety code 2003 IFC for building construction. The City of Leavenworth has adopted the 1997 Uniform Building Code, 1997 Uniform Mechanical Code, 1997 Uniform Plumbing Code, and 1996 National Electric Code. The City of Leavenworth uses the adopted 85 Fire Code and the 97 Uniform Building Code, and references the 2006 NFPA 101 Life Safety Codes, with the recommendation that these Codes be followed. The City of Linwood has adopted the 2006 International Building Code. The City of Tonganoxie utilizes the following building codes for construction: International Building and Residential Codes (2000 Edition); National Electric Code (1999 Edition); Uniform Code for the Abatement of Dangerous Buildings (1997 Edition); International Mechanical Code (2000 Edition); Uniform Housing Code (1997 Edition); International Plumbing Code (2000 Edition); and International Fire Code (2003 Edition).*

### Planning

In order to exercise the regulatory powers conferred by the General Statutes, local governments in Kansas are required to create or designate a planning agency. The planning agency may perform a number of duties, which include the following: make studies of the area; determine objectives; prepare and adopt plans for achieving those objectives; develop and recommend policies, ordinances, and administrative means to implement plans; and perform other related duties. The importance of the planning powers of local governments is emphasized in Kansas statutes, which require that zoning regulations be made in accordance with a comprehensive plan. While the ordinance itself may provide evidence that zoning is being conducted "in accordance with a plan", the existence of a separate planning document ensures that the government is developing regulations and ordinances that are consistent with the overall goals of the jurisdiction.

*Leavenworth County has established a Planning Commission and currently employs a full-time planner who shares review and approval duties with the Leavenworth County Planning Board to oversee the County's Comprehensive Land Plan, Floodplain Management Ordinance, and subdivision and zoning regulations. The Cities of Basehor and Leavenworth currently employ full-time Planners and have established Planning Committees to assist the Planners for future development within their respective city. The Cities of Lansing and Linwood have established Planning Commissions to oversee the future development within the respective cities. The City of Tonganoxie has established a Planning Committee to assist the Planner in managing growth for their community. The City of Tonganoxie will occasionally employ an independent Planner to assist with development activities. The City of Easton has not established a Planning Committe and does not employ Planners within the community.*

### County Ordinances

Leavenworth County has three ordinances that are relevant to hazard mitigation. The ordinances will be considered when developing this Plan's Mitigation Strategy.

Leavenworth County has established an Emergency Management Department for protection of people, property and environment within the county.

Leavenworth County has adopted burn ban ordinance #2006-23 for protection from wildfire in the county.

Leavenworth County adopted a Floodplain Management Ordinance in 2004 to promote the public health, safety, and general welfare, to minimize loss in special flood hazard areas (SFHAs), and maintain the county's eligibility for participation in the National Flood Insurance Program (NFIP).

### City Ordinances

The City of Basehor has enacted and enforces regulatory ordinances designed to promote the public health, safety and general welfare of its citizenry. These ordinances include building codes, zoning and permitting, subdivision regulations, floodplain management ordinances, and a Comprehensive Land Plan.

The City of Lansing has enacted and enforces regulatory ordinances designed to promote the public health, safety and general welfare of its citizenry. These ordinances include building codes, permitting ordinances, subdivision regulations, planning and zoning (Public Works Department Community Development Division), floodplain (zoning) ordinances, stormwater management ordinances, burn ban ordinances, and a Comprehensive Land Plan.

The City of Leavenworth has enacted and enforces regulatory ordinances or regulations designed to promote the public health, safety and general welfare of its citizenry. These ordinances include building codes, zoning and permitting ordinances, subdivision regulations, floodplain and stormwater management ordinances, burn ban regulations, and a Comprehensive Land Plan.

The City of Linwood has enacted and enforces regulatory ordinances designed to promote the public health, safety and general welfare of its citizenry. These ordinances include building codes, zoning and permitting ordinances, floodplain management ordinances, subdivision regulations, and a Comprehensive Land Plan.

The City of Tonganoxie has enacted and enforces regulatory ordinances or regulations designed to promote the public health, safety and general welfare of its citizenry. These ordinances include building codes, zoning and permitting ordinances, subdivision regulations, stormwater management ordinances, floodplain management ordinances, a floodplain management plan, burn ban regulations, and a Comprehensive Land Plan.

The City of Easton did not identify any regulatory functions that the city enforces for hazard mitigation, but is a participant in the NFIP.

### Zoning

Zoning is the traditional and most common tool available to local governments to control the use of land. Kansas statutes grant municipalities and counties broad enabling authority to engage in zoning for land use. Counties may also regulate inside municipal jurisdiction at the request of a municipality. The statutory purpose for the grant of zoning power is to promote health, safety, morals, and the general welfare of the community. Land "uses" controlled by zoning include the type of use (e.g., residential, commercial, industrial) as well as minimum specifications for use such as lot size, building height and set backs, density of population, etc.

Local governments are authorized to divide their territorial jurisdiction into districts, and to regulate and restrict the erection, construction, reconstruction, alteration, repair or use of buildings, structures, or land within those districts. Districts may include general use districts, overlay districts, special use districts or conditional use districts. Zoning ordinances consist of maps and written text.

*Leavenworth County (unincorporated), and the Cities of Basehor, Lansing, Leavenworth, Linwood, and Tonganoxie have adopted zoning ordinances to guide growth within their respective jurisdictions. The City of East has not adopted zoning regulations to guide the growth of their community.*

### Subdivision Regulations

Subdivision regulations control the division of land into parcels for the purpose of building development or sale. Flood-related subdivision controls typically require that sub-dividers install adequate drainage facilities and design water and sewer systems to minimize flood damage and contamination. They prohibit the subdivision of land subject to flooding unless flood hazards are overcome through filling or other measures, and they prohibit filling of floodway areas. Subdivision regulations require that subdivision plans be approved prior to the division and/or sale of land. Subdivision regulations are a more limited tool than zoning and only indirectly affect the type of use made of land and the specifications for structures on that land.

Broad subdivision control authority resides with the county for areas outside of municipalities and municipal extra-territorial planning jurisdictions. Subdivision is defined as all divisions of a tract or parcel of land divided into two or more lots and all divisions involving new streets. Application and approval for water meter installation play an important part in the planning process.

*Leavenworth County (unincorporated), and the Cities of Basehor, Lansing, Leavenworth, Linwood, and Tonganoxie have adopted subdivision regulations to guide growth within their respective jurisdictions. The City of Easton does not enforce subdivision regulations to guide growth in their community.*

### Floodplain Regulation

In February of 1992, the Kansas General Assembly approved legislation for floodplain management (K.S.A. 12-766, entitled "Floodplain Management") authorizing the Department of Agriculture, Division of Water Resources, as the primary department to oversee and approve local zoning regulation. The regulation requires planning and approval to prevent inappropriate development in the one hundred-year floodplain and to reduce flood hazards (Reference Kansas Statute for details).

The purpose of the law is threefold: (1) minimize the extent of floods by preventing obstructions that inhibit water flow and increase flood height and damage; (2) prevent and minimize loss of life, injuries, property damage and other losses in flood hazard areas; and (3) promote the public health, safety and welfare of citizens of Kansas in flood hazard areas.

The new statute affects local governments by directing, not mandating, them to do the following: (1) manage planned growth; (2) adopt local ordinances to regulate uses in flood hazard areas; (3) enforce those ordinances; (4) grant permits for use in flood hazard areas that are consistent with the ordinance. The act also makes certain that local ordinances meet the minimum requirements of participation in the National Flood Insurance Program (NFIP).

The incentive for local governments adopting such ordinances is that they will afford their residents the ability to purchase flood insurance through the NFIP. In addition, communities with such ordinances in place will be given priority in the consideration of applications for loans and grants from the Clean Water Revolving Loan and Grant Fund. Additional points may be awarded for actions taken toward the implementation of a comprehensive land-use plan, such as the adoption of a zoning ordinance or any other measure that significantly contributes to the implementation of the comprehensive land-use plan and the flood management ordinance.

*Leavenworth County (unincorporated) and the cities of Basehor, Easton, Lansing, Leavenworth, Linwood, and Tonganoxie have adopted Floodplain Management Ordinances, and currently participate in the National Flood Insurance Program. Leavenworth County (unincorporated) adopted floodplain management regulations in 2004. The Leavenworth County Floodplain Ordinance requires a floodplain development permit for all proposed construction or other development, including the placement of manufactured homes in all lands identified as unnumbered A, AE, AO, and AH zones on the Index Map dated September 16, 2004, of the Flood Insurance Rate Map (FIRM), or the Index Map dated September 16, 2004, of the Flood Hazard Boundary Map (FHBM) as amended, and any future revisions thereto. Permits may only be granted by the County Commission or its duly designated representative.*

### Acquisition

The power of acquisition can be a useful tool for pursuing local mitigation goals. Local governments may find the most effective method for completely “hazard-proofing” a particular piece of property or area is to acquire the property (either in fee or a lesser interest, such as an easement), thus removing the property from the private market and eliminating or reducing the possibility of inappropriate development occurring. Kansas legislation empowers cities, towns, counties to acquire property for public purpose by gift, grant, devise, bequest, exchange, purchase, lease or eminent domain (County Home Rule Powers, K.S.A. 19-101, 19-101a, 19-212).

*Acquisition has been used as a local mitigation tool in the past. There were 22 repetitive loss properties identified in incorporated areas of Leavenworth County, three of which have been mitigated. Reference Section 4.5.3 "Vulnerability Estimation by Hazard - Repetitive Loss Properties". FEMA has worked with local property owners to acquire seven flood-prone homes in unincorporated Leavenworth County which were not identified as repetitive loss properties as they were not insured in the NFIP. The City of Leavenworth has identified 35 residential structures and 22 commercial structures that may be targeted for future acquisition activities. Of these identified structures, one (1) residential structure and one (1) commercial structure appear on the Repetitive Loss Properties list for the City of Leavenworth.*

### Taxation

The power to levy taxes and special assessments is an important tool delegated to local governments by Kansas law. The power of taxation extends beyond merely the collection of revenue, and can have a profound impact on the pattern of development in the community. Communities have the power to set preferential tax rates for areas which are more suitable for development in order to discourage development in otherwise hazardous areas.

Local units of government also have the authority to levy special assessments on property owners for all or part of the costs of acquiring, constructing, reconstructing, extending or otherwise building or improving flood control within a designated area. This can serve to increase the cost of building in such areas, thereby discouraging development.

Because the usual methods of apportionment seem mechanical and arbitrary, and because the tax burden on a particular piece of property is often quite large, the major constraint in using special assessments is political. Special assessments seem to offer little in terms of control over land use in developing areas. They can, however, be used to finance the provision of necessary services within municipal or county

boundaries. In addition, they are useful in distributing to the new property owners the costs of the infrastructure required by new development.

*Leavenworth County (unincorporated), and the Cities of Basehor, Easton, Lansing, Leavenworth, Linwood, and Tonganoxie levy property taxes, but do not use any preferential tax districts or special assessments for purposes of guiding growth and development, other than some public funds that are used for economic development, and support of the recreation commission that supports public use facilities.*

#### Spending

The fourth major power that has been delegated from the Kansas General Assembly to local governments is the power to make expenditures in the public interest. Hazard mitigation principles can be made a routine part of all spending decisions made by the local government, including the adoption of annual budgets and a Capital Improvement Plan (CIP).

A CIP is a schedule for the provision of municipal or county services over a specified period of time. Capital programming, by itself, can be used as a growth management technique, with a view to hazard mitigation. By tentatively committing itself to a timetable for the provision of capital to extend services, a community can control growth to some extent, especially in areas where the provision of on-site sewage disposal and water supply are unusually expensive.

In addition to formulating a timetable for the provision of services, a local community can regulate the extension of and access to services. A CIP that is coordinated with extension and access policies can provide a significant degree of control over the location and timing of growth. These tools can also influence the cost of growth. If the CIP is effective in directing growth away from environmentally sensitive or high hazard areas, for example, it can reduce environmental costs.

*Leavenworth County (unincorporated) and the City of Easton do not utilize capital improvement planning programs for growth management. The cities of Basehor, Lansing, Leavenworth, Linwood, and Tonganoxie utilize capital improvement planning for growth management of infrastructure.*

### 3.10.3 Program Capability

This part of the capabilities assessment includes the identification and evaluation of existing plans, policies, practices, programs, or activities that either increase or decrease the community's vulnerability to natural hazards. Positive activities, which decrease hazard vulnerability, should be sustained and enhanced if possible. Negative activities which increase hazard vulnerability should be targeted for re-consideration and be thoroughly addressed within the Mitigation Strategy for the entire Leavenworth County planning area.

#### National Flood Insurance Program (NFIP)

The decision on whether to join the NFIP is very important for a jurisdiction (community).There is no Federal law that requires a jurisdiction to join the program, and participation is voluntary. A benefit of participation is that the citizens are provided the opportunity to purchase flood insurance to protect themselves against flood losses. Another consideration is that a jurisdiction that has been identified by FEMA as being flood-prone and has not joined the NFIP within one year of being notified of being mapped as flood-prone will be sanctioned.

Jurisdictions that regulate development in floodplains are able to participate in the National Flood Insurance Program (NFIP). To participate in the NFIP the jurisdiction must adopt and enforce floodplain management regulations that meet or exceed the minimum requirements of the program. The jurisdiction must submit an application package that includes the following:

- The jurisdiction must make an Application for Participation in the NFIP (FEMA Form 81-64);
- The jurisdiction must adopt a Resolution of Intent, which indicates an explicit desire to participate in the NFIP and a committment to recognize flood hazards and carry out the objectives of the program;

- The jurisdiction must adopt and submit Floodplain Management Regulations that exceed the minimum flood plain management requirements of the NFIP (Title 44 of the Code of Federal Regulations (44 CFR) section 60.3);
- The jurisdiction's floodplain management regulations must be legally enforceable.

Leavenworth County (unincorporated) adopted floodplain management regulations in 2004. The resolution applies to all areas designated as Zones A, AE, AO, and AH on the Index Map dated September 16, 2004, of the Flood Insurance Rate Map (FIRM), or the Index Map dated September 16, 2004, of the Flood Hazard Boundary Map (FHBM) as amended, and any future revisions thereto. Currently, 53 residents within the unincorporated area of the county have flood insurance with total coverage of $9,886,200. Since 1978, 25 claims for a total of $205,378 have been made.

The City of Basehor passed a Floodplain Management Ordinance in March, 1984 (Ordinance No. 175). Currently, three residents have flood insurance with coverage of $744,900. The City of Basehor has had one insurance claim since 1978 totaling $6,925.

The City of Easton passed a Floodplain Management Ordinance in June, 2009 (Ordinance No. 2009-03). Currently, 28 residents have flood insurance with coverage of $3,550,000. The City of Easton has had 111 claims since 1978 totaling $1,461,919.

The City of Lansing passed a Floodplain Management Ordinance in September, 2004 (Ordinance No. 389). Currently, 37 residents have flood insurance with coverage of $9,795,400. The City of Lansing has had three insurance claims since 1978 totaling $13,795.

The City of Leavenworth passed a Floodplain Management Ordinance in August 2009. Currently, 86 residents have flood insurance with coverage of $16,435,000. The City of Leavenworth has had 48 insurance claims since 1978 totaling $499,411.

The City of Linwood passed a Floodplain Management Ordinance in September, 1987 (Ordinance No. 578). Currently, two residents have flood insurance with coverage of $124,500. The City of Linwood has had one insurance claim since 1978 with no total claim payout identified.

The City of Tonganoxie passed a Floodplain Management Ordinance in July, 2000 (Ordinance No. 1036). In 2009, Floodplain Management Ordinance No. 1280 was passed, repealing Ordinanace No. 1036. Currently, five residents have flood insurance with coverage of $586,700. The City of Tonganoxie has had eight insurance claims since 1978 totaling $72,883.

Unified School District #453 serves the residents of Leavenworth County and has schools located in the City of Leavenworth. The City of Leavenworth is a participant in the NFIP, making flood insurance available to the school district. At this time, the school district did not identify a need for flood insurance for their facilities, but does support continued compliance with NFIP procedures.

Unified School District #449 serves the residents of Leavenworth County and has schools located in Leavenworth County and Easton. Both of these jurisdictions currently participate in the NFIP, making flood insurance available to the school district. At this time, the school district did not identify a need for flood insurance for their facilities, but does support continued compliance with NFIP procedures.

Unified School District #458 serves the residents of Leavenworth County and has schools located in the communities of Basehor and Linwood. Both of these cities currently participate in the NFIP, making flood insurance available to the school district. At this time, the school district did not identify a need for flood insurance for their facilities, but does support continued compliance with NFIP procedures.

Unified School District #464 serves the residents of Leavenworth County and has schools located in the City of Tonganoxie. The City of Tonganoxie is a participant in the NFIP, making flood insurance available to the school district. The USD reported that a portion of the property containing the District Stadium and Fieldhouse located at the Tonganoxie High School was located in a floodplain. At this time,

the school district did not identify a need for flood insurance for this area or their other facilities, but does support continued compliance with NFIP procedures.

Unified School District #469 serves the residents of Leavenworth County and has schools located in the City of Lansing. The City of Lansing is a participant in the NFIP, making flood insurance available to the school district. The USD reported that a portion of USD property, located in close proximity to Seven Mile Creek, was located in a floodplain. At this time, the school district did not identify a need for flood insurance for this area or their other property or facilities, but does support continued compliance with NFIP procedures.

### Community Rating System Activities (CRS)

Jurisdictions that regulate development in floodplains are able to participate in the National Flood Insurance Program (NFIP). In return, the NFIP makes federally backed flood insurance policies available for properties in the jurisdiction. The Community Rating System (CRS) was implemented in 1990 as a program for recognizing and encouraging jurisdiction floodplain management activities that exceed the minimum NFIP standards. There are ten CRS classes. Class 1 requires the most credit points and earns the largest premium reduction, while Class 10 receives no premium reduction. It is a long process to become a participating CRS community, taking almost one year from application to acceptance. New CRS communities are admitted only on October 1 and May 1 of each year.

*Leavenworth County and the cities of Basehor, Easton, Lansing, Leavenworth, Linwood, and Tonganoxie do not participate in the CRS program.*

### Recent Hazard Mitigation Efforts

Leavenworth County and the cities of Basehor, Lansing, Leavenworth, Linwood, and Tonganoxie have taken specific mitigation efforts that included adoption of floodplain management ordinances for participation in the NFIP.

Acquisition has been used as a local mitigation tool. There were 22 repetitive loss properties identified in incorporated areas of Leavenworth County, three of which have been mitigated. Two properties were located in Easton and one was located in the City of Leavenworth. Reportedly, the structures on the properties have been demolished, with the areas returned to green.

In addition to the identified repetitive loss properties, FEMA has worked with local property owners in unincorporated Leavenworth County to acquire seven flood-prone homes which were not identified as repetitive loss properties as they were not insured in the NFIP.

### Emergency Operations Plan

Leavenworth County has developed and adopted an Emergency Operations Plan that pre-determines actions to be taken by government agencies and private organizations in response to an emergency or disaster event. This plan was developed according to the requirements of the Kansas Planning Standard which incorporates Federal requirements in place at the time of development. The Plan was first adopted in 1987. The county is currently in the process of updating their LEOP to current State and Federal standards. For the most part, the Plan describes the county’s capabilities to respond to emergencies and establishes the responsibilities and procedures for responding effectively to the actual occurrence of a disaster.

*The plan does not specifically address hazard mitigation, but it does identify the specific operations to be undertaken by the county to protect lives and property immediately before, during and immediately following an emergency. There are no foreseeable conflicts between this Hazard Mitigation Plan and Leavenworth County's Emergency Operations Plan, primarily because they are each focused on two separate phases of emergency management (mitigation vs. preparedness and response). The incorporated cities within Leavenworth County are not designated as "jurisdictions" as defined by the State of Kansas and therefore have not developed and adopted an Emergency Operations Plan. The cities rely on the Leavenworth County Emergency Operations Plan in the event of an emergency or disaster event.*

### Comprehensive Land Use Plan

A Comprehensive Land Use Plan is designed with the goal of balancing environmental protection with economic development in all areas of the jurisdiction. This plan coupled with various other planning efforts provides resources to local leaders to establish policies to guide the development of the community. Annexation, expansion, and building projects are generally guided by these documents.

*Leavenworth County (unincorporated) has adopted a Comprehensive Land Plan, dated May 28, 2008. The City of Basehor has adopted a Comprehensive Land Plan, dated June 2006. The City of Easton has not adopted a Comprehensive Land Plan for the community. The City of Lansing has adopted a Comprehensive Land Plan, dated October 2001. The City of Leavenworth has adopted a Comprehensive Land Plan, dated June 1998. The City of Linwood has adopted a Comprehensive Land Plan, dated March 2009. The City of Tonganoxie has adopted a Comprehensive Land Plan, dated 2002 (updated August 2006). Leavenworth County (unincorporated) and the cities of Basehor, Easton, Lansing, Linwood, Leavenworth, and Tonganoxie support the National Flood Insurance Program. Leavenworth County (unincorporated) and the cities of Basehor, Easton, Lansing, Linwood, Leavenworth, and Tonganoxie support the use of best management practices recommendations of the United States Soil Conservation Service.*

### Floodplain Management Plan

A Floodplain Management Plan (FMP) is a future-oriented approach to planning in flood risk areas. It's a pre-disaster planning approach that is required by the Federal Emergency Management Agency (FEMA) to continue to participate in the National Flood Insurance Program's Community Rating System (CRS).

*Leavenworth County (unincorporated) and the cities of Basehor, Easton, Lansing, Linwood, Leavenworth, and Tonganoxie do not currently have a comprehensive floodplain management plan for purposes of the National Flood Insurance Program's Community Rating System (CRS). However, this Hazard Mitigation Plan is intended to fulfill the CRS planning requirement when it becomes adopted, and will be maintained as such.*

### Stormwater Management Plan

The purpose of the Stormwater Management Plan is to comprehensively address how to meet the many different but related regulations, adopted plans and programs, and policies that affect urban stormwater, flooding and associated water-dependent resources.

*Leavenworth County (unincorporated) does not apply stormwater management provisions through their subdivision regulations, but does address the National Pollutant Discharge Elimination Permit System (NPDES) requirements for protection of natural waterways. According to the Leavenworth County Subdivision Ordinance, lands subject to flooding, irregular drainage conditions, excessive erosion and other reasons unsuitable for residential use shall not be platted for residential use unless the hazards can be and are corrected. For major subdivisions, a stormwater drainage plan must be prepared and necessary stormwater drainage improvements must be completed before final plat approval. The cities of Lansing, Leavenworth, and Tonganoxie have adopted stormwater management plans for their jurisdictions. The cities of Linwood and Easton have not adopted stormwater management plans for their jurisdictions. The City of Basehor has not adopted stormwater management plan for its jurisdiction, but uses Section 5600 of the American Public Works Association (APWA).*

### 3.10.4 Fiscal Capability

Leavenworth County has reported that they have limited fiscal capability to implement hazard mitigation strategies due to general economic, environmental, and budget pressures on the county. For fiscal year 2007, Leavenworth County's adopted budgeted expenditures were $41,641,291. The majority of these funds are obligated to basic county support services and human services. Leavenworth County receives 46.8% of its revenues through Ad Valorem taxes with the remaining revenues coming from various other sources.

It is possible, with advance planning, that jurisdictions in Leavenworth County could afford to provide the local match for the existing hazard mitigation grant programs if the State of Kansas did not do so itself. However, the current revenue shortfalls at both the state and local government level in Kansas, and the apparent increased reliance on local accountability by the federal government, are a significant and growing concern for Leavenworth County.

The City of Basehor has reported that they have very limited fiscal capability to implement hazard mitigation strategies due to the general economic, environment, and budget pressures in the city. For fiscal year 2008, the City of Basehor's adopted budgeted expenditures were $11,525,609. The majority of these funds are obligated to basic support services and human services. The City of Basehor reported that they could not provide the local match for the current hazard mitigation programs, but would consider doing so with council approval.

The City of Easton has reported that they have very limited fiscal capability to implement hazard mitigation strategies due to the general economic, environment, and budget pressures in the city. For fiscal year 2008, the City of Easton's adopted budgeted expenditures were $246,486. The majority of these funds are obligated to basic support services and utility services. The City of Easton reported that they may be able to provide the local match for the current hazard mitigation programs.

The City of Lansing has reported that they have limited fiscal capability to implement hazard mitigation strategies due to the general economic, environment, and budget pressures in the city. For fiscal year 2008, the City of Lansing's adopted budgeted expenditures were $12,822,503. The majority of these funds are obligated to basic support services and human services. The City of Lansing reported that they may be able to provide the local match for the current hazard mitigation projects, dependant upon the total cost of the mitigation programs, without issuing debt or causing undue hardship upon the city.

The City of Leavenworth has reported that they have limited fiscal capability to implement hazard mitigation strategies due to the general economic, environment, and budget pressures in the city. For fiscal year 2008, the City of Leavenworth's adopted budgeted expenditures were $19,148,284. The majority of these funds are obligated to basic support services and human services. The City of Leavenworth reported that they could provide the local match for the current hazard mitigation programs.

The City of Linwood has reported that they have very limited fiscal capability to implement hazard

mitigation strategies due to the general economic, environment, and budget pressures in the city. For fiscal year 2008, the City of Linwood's adopted budgeted expenditures were $1,890,750. The majority of these funds are obligated to basic support services and human services. The City of Linwood reported that they could not provide the local match for the current hazard mitigation grant programs.

The City of Tonganoxie has reported that they have limited fiscal capability to implement hazard mitigation strategies due to the general economic, environment, and budget pressures in the city. For fiscal year 2009, the City of Tonganoxie's adopted budgeted expenditures are expected to be $15,957,912. The majority of these funds are obligated to basic support services and human services. The City of Tonganoxie reported that they could provide the local match for the current hazard mitigation grant programs, if properly budgeted.

The Unified School Districts (USDs) located in Leavenworth County are funded through local taxation. Leavenworth County is responsible for property tax valuation and collection in support of operation of the public school system based on public education levy. Taxes are paid to the state then re-distributed back to the counties based on State formula. These funds generally maintain buildings, provide funds for capital projects, and also include paying salaries, purchasing textbooks and supplies.

USD 449 (Easton and Leavenworth) has reported that the district has limited fiscal capability to implement the hazard mitigation strategies, if the voters in the district approve the bonds in an election. The USD does not have the capability to construct safe rooms using general, local option, or capital outlay funds. The 2008-2009 general and local option budgets total was reported to be $6,979,747. The majority of these funds pay for salaries, utilities, maintenance, and supplies.

USD 453 (Leavenworth) has reported that the district has the fiscal capability to implement the hazard mitigation strategies, due to an approved bond referendum in November 2008. The District could provide the local match for the existing hazard mitigation grant programs through bond issues, if the State of Kansas did not provide a means to obtain the matching funds. The 2008 budgeted expenditures was reported to be $57,913,539. The majority of these funds pay for salaries, utilities, maintenance, and supplies.

USD 458 (Basehor-Linwood) has reported that they have limited fiscal capability to implement hazard mitigation strategies due to budget capabilities. The District could provide the local match for the existing hazard mitigation grant programs through bond issues, if the State of Kansas did not provide a means to obtain the matching funds. For fiscal year 2008, Basehor-Linwood USD 458's budgeted expenditures were $12,300,000. The majority of these funds pay for salaries, utilities, maintenance, and supplies.

USD 464 (Tonganoxie) has reported that the district has the fiscal capability to implement the hazard mitigation strategies if bond issues become available, through which the District could provide the local match for the existing hazard mitigation grant programs if the State of Kansas did not provide a means to obtain the matching funds. The 2008-2009 budgeted expenditures was reported to be $12,570,262. The majority of these funds pay for salaries, utilities, maintenance, and supplies.

USD 469 (Lansing) has reported that they have limited fiscal capability to implement hazard mitigation strategies due to budget capabilities. The USD does not believe it could provide the local match for the existing hazard mitigation grant programs if the State of Kansas did not provide a means to obtain the matching funds. For fiscal year 2008, the USD's budgeted expenditures were $12,000,000. The majority of these funds pay for salaries, utilities, maintenance, and supplies.

St. Mary University has reported that they have limited fiscal capability to implement hazard mitigation strategies due to limited budget capabilities, and could not provide the local match for the existing hazard mitigation grant programs if the State of Kansas did not provide a means to obtain the matching funds. For fiscal year 2007-2008, St. Mary University’s adopted budgeted expenditures were $12,557,232.

### Small Impoverished Community Criteria

Under the Disaster Mitigation Act of 2000, FEMA has made special accommodations for "small and impoverished communities", who will be eligible for a 90% Federal share, 10% non-Federal cost split for projects funded through the Pre-Disaster Mitigation Grant Program. The community must meet all of the following criteria:

- Must be a community of 3,000 or fewer individuals that is identified by the state as a rural community, and is not a remote area within the corporate boundaries of a larger city;
- Must be economically disadvantaged, with residents having an average per capita annual income not exceeding 80 percent of the national per capita income, based on best available data;
- Must have a local unemployment rate that exceeds by one percentage point or more the most recently reported, average yearly national unemployment rate;
- Must meet any other factors as determined by the state/Indian tribe/territory in which the community is located.

Each jurisdiction should consider potential eligibility under this criteria when developing project grant applications and funding alternatives.

## 3.10.5 Political Willpower

Many Leavenworth County residents are becoming more knowledgeable about the potential hazards that their jurisdiction faces, and in recent years, they have become more familiar with the practices and principles of mitigation. The County's adoption of the National Flood Insurance Program and the steps taken to update its emergency operations programs provide some insight into the county's desire to comply with mitigation policy and procedure. It is strongly believed that such tangible changes within the county have created a greater sense of awareness among local residents, and that hazard mitigation is a concept that they are beginning to readily accept and support.

Because of this belief, coupled with Leavenworth County’s history with natural disasters, it is expected that the current and future political climates are and will be favorable to supporting and advancing future hazard mitigation strategies.

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# 4.0 Risk Assessment

This risk assessment identifies the natural hazards affecting Leavenworth County. It provides information on the history and severity of hazards, evaluates the possible effects, identifies vulnerable populations and assets (buildings, critical facilities and essential infrastructure), and estimates potential losses that might occur. This risk assessment process identifies the most critical problems and issues--identified as high and moderate--that require mitigation actions. In summary, the assessment identifies the hazards, assigns a likelihood value, evaluates vulnerability, and then calculates an overall risk index value.

The goal of risk analysis is to formulate an assessment of the probability of occurrence for a hazardous event in tandem with its anticipated severity. Probability or likelihood of occurrence is expressed in terms of events over time. Occurrence probability is determined from actual historical data when available. Otherwise, it may be described in relative terms (negligible, low, moderate, and high). Severity is expressed in relative terms of damage, injury, and overall residual impact resulting from the event. Severity is determined from utilizing established rating systems (e.g., National Fire Protection Association (NFPA) Material Factors, Fujita Scale, Mercalli/Richter Scale, etc.) or may be derived from subjective criteria based on justifiable assumptions. Worst-case scenarios can be assumed. Elaborate quantitative release probabilities are generally not required. Risk analysis should focus on creating reasonable estimates based on the best available data. Primary components:

- Probability that a release will occur and any unusual environmental conditions, such as flood plain areas, seismic activity, or potential for simultaneous occurrence of emergency incidents (e.g., flooding or fire hazards associated with the release of hazardous materials).
- Classification of potential harm to humans (acute, delayed, chronic) and identification of high-risk groups.
- Classification of potential harm and damage to commercial livestock (when applicable).
- Classification of potential damage to property (temporary, repairable, permanent).
- Classification of potential damage to the environment (recoverable, permanent).

## 4.1 Identification of Hazards

*Multihazard Requirement §201.6(c)(2)(i): [The risk assessment shall include a] description of the type … of all natural hazards that can affect the jurisdiction.*

### State Hazards Review

When considering the hazards identified for Leavenworth County, the State Mitigation Plan was referenced as a comparison to the identified county hazards. The hazards identified on the State list were compared/eliminated based on the county-specific hazard analysis.

### TABLE 4.1 (1) STATE OF KANSAS HAZARDS LIST (Alphabetically)

TABLE 4.1 (1) STATE OF KANSAS HAZARDS LIST (Alphabetically)

| | | |
|---|---|---|
| Agricultural Infestation | Dam and Levee Failure | Drought |
| Earthquake | Expansive soils | Extreme Temperatures |
| Flood | Fog | Hailstorm |
| Hazardous Materials | Land Subsidence | Lightning |
| Major Disease Outbreak | Radiological | Soil Erosion and Dust |
| Terrorism/Agri-Terrorism/Civil Disorder | Tornado | Utility/Infrastructure Failure |
| Wildfire | Windstorm | Winter Storm |

The State, County, and local plans do not address the FEMA listed hazards in Table 4.1 (2) because they do not exist or threaten the jurisdictions of Kansas. As an example, the topography of Kansas does not contain mountainous areas which would support the possibility of avalanche; the county is not adjacent to a coastline.

## TABLE 4.1 (2) NON-PROFILED HAZARDS

TABLE 4.1 (2) NON-PROFILED HAZARDS

| |
|---|
| *Thunderstorm |
| Avalanche |
| Coastal Erosion |
| Coastal Storm |
| Hurricane |
| Tsunami |
| Volcano |

*FOOTNOTE: Thunderstorm, as a specific event, is not included in this analysis. Thunderstorms are common occurrences in Leavenworth County, but are considered low-risk due to their typical weak intensity. However, this plan does address the more significant and severe effects of thunderstorms (i.e., severe thunderstorms can include lightning, hail, flood, and tornadoes, which can co-exist with microbursts) as stand-alone events in this report.

The jurisdictions comprising this plan have chosen to use the 58 years of data available from NOAA's National Weather Service (NWS) in order to identify hazards which have had an impact on a local basis. The advantage to using this database is that it provides location, extent, and probability for documented and reported events over time. The intent is to compare the hazards to the State Hazard list and then to apply extent and probability in order to prioritize and rank the hazards.

It should be recognized that the NOAA data for the overall multi-jurisdictional area did not document or report events for the following State listed hazards. The MPC found no local data to document or report on these hazards; estimated the overall probability as low; or found that they are covered by other circumstances or plans as noted below. Consequently, the MPC eliminated them as hazards to address in the plan.

Agricultural Infestation - The MPC found no jurisdiction specific data to support this hazard as a High or Moderate type. Generally, local infestations are mitigated by the land owner with limited other assistance. Livestock related infestation would be covered by the County Foreign Animal Disease Plan.

Drought, Soil Erosion, and Dust – No documented or reported significant events. Related crop or agro damage was found to be covered by private insurance.

Expansive soils; Land Subsidence - The MPC found no jurisdiction specific data to support this hazard as a High or Moderate type. Geology would not indicate a significant issue.

Extreme Temperatures – NOAA data for Excessive Heat has been matched to this hazard and is addressed in the plan as such.

Fog - The MPC found no jurisdiction specific data to support this hazard as a High or Moderate type.

Hazardous Materials – The MPC found that this potential hazard is addressed by the County Local Emergency Operations Plan (LEOP) and other requirements of SARA Title III. Preparation, mitigation,

and funding is addressed by the LEOP.

Lightning - NOAA data for TSTM (Thunderstorm) Wind has been matched to this hazard and is addressed in the plan as such.

Major Disease Outbreak – The MPC found that this potential hazard is addressed by the County Public Health Plan (CPHP) and its continuing development. Preparation, mitigation, and funding is addressed by the CPHP.

Radiological - No documented or reported significant events. No reported facilities in the jurisdictions with reportable quantities per SARA Title III. This hazard would also be addressed as part of the Local Emergency Operations plan when identified.

Windstorm - NOAA data for High Wind has been matched to this hazard and is addressed in the plan as such.

Flood, Flash Flood, and Urban Flood are addressed as Flood for planning purposes.

NOAA also documents and reports several other potential hazards in a more detailed fashion. This would include TSTM Wind, High Wind, Ice Storm, Sleet, Glaze, Blizzard, Heavy Snow, Extreme Windchill, and Winter Storm. After reviewing the NOAA definitions, the MPC elected to address TSTM Wind and High Wind as TSTM Wind; and to address Winter Storm, Ice Storm, Sleet, Glaze, Blizzard, Extreme Windchill, and Heavy Snow as Winter Storm. Where provided, the table data for all is listed for informational purposes and future planning consideration.

The following table is a cumulative view of the overall events that were documented and reported for Leavenworth County over the 58 year period. This table also summarizes the extent, or severity, and allows for calculation of probability. Although shown here for purposes of listing all potential hazards, it is the basis for the balance of this section including the vulnerability discussion.

Please note the following with regard to the following Tables and Figures:

- Magnitude classifications for tornadoes are based upon the accepted intensity scales for each. Other hazards are classified by their maximum potential severity or as otherwise deemed appropriate.
- The following tables illustrate the results from applying the risk-rating algorithm for analysis and hazard profile, and form the basis of risk for each type of potential hazard event identified in Leavenworth County.
- The hazards Dam/Levee, Terrorism/Agri-Terrorism/Civil Disorder, and Utility Failure are State mandated hazards which must be considered and addressed in all Kansas plans. Table 4.1 (3) indicates no documented or reported events in the NOAA database. Any documentation of events outside this database will be discussed in the Hazard Profile. Since the MPC has elected to address only hazards ranked as high and moderate, these hazards were given a Risk Rating of 1, which would cause them to rank in the moderate category. This will also incorporate the hazards into the review process over the next five years.

## TABLE 4.1 (3) LEAVENWORTH COUNTY RISK RATING

TABLE 4.1 (3) LEAVENWORTH COUNTY RISK RATING

| Event | # Events | # Years | Likelihood (Li) | Severity Index (Avg) | Severity Index (Avg) | Severity Index (Avg) | Severity Index (Avg) | Severity Index (Avg) | Severity Rating | Risk Rating |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Events/ Years | M | D | I | Pd | Cd | Sr=M+D+ I+Pd+Cd | R=(Sr) x (L) |
| Flood | 101 | 15 | 6.73 | 3 | 0.5 | 0.5 | 2 | 1 | 7 | 47.13 |
| Hail | 179 | 46 | 3.89 | 3 | 0.5 | 0.5 | 2 | 2 | 8 | 31.13 |
| * Wildfire | 573 | 52 | 11.02 | 0.5 | 0.5 | 0.5 | 0 | 0.5 | 2 | 22.04 |
| Winter Storm | 23 | 15 | 1.53 | 3 | 0.5 | 0.5 | 1 | 0.5 | 5.5 | 8.43 |
| TSTM Wind | 140 | 53 | 2.64 | 0.5 | 0.5 | 0.5 | 1 | 0.5 | 3 | 7.93 |
| Excessive Heat | 14 | 15 | 0.93 | 2 | 1 | 0.5 | 0.5 | 0.5 | 4.5 | 4.20 |
| Tornado | 28 | 56 | 0.50 | 2 | 1 | 0.5 | 2 | 0.5 | 6 | 3.00 |
| (M) Dam/Levee | 0 | 0 | 0.00 | 0 | 0 | 0 | 0 | 0 | 0 | 1.00 |
| (M) Terrorism / AT / CD | 0 | 0 | 0.00 | 0 | 0 | 0 | 0 | 0 | 0 | 1.00 |
| (M) Utility Failure | 0 | 0 | 0.00 | 0 | 0 | 0 | 0 | 0 | 0 | 1.00 |
| ** Earthquake | 25 | 110 | 0.23 | 1 | 0.5 | 0.5 | 0.5 | 0.5 | 2.5 | 0.68 |

Table Footnotes:

*Reported events and likelihood estimates are based on averages from wildfire exponential smoothing of Kansas Fire Marshal data.

**Reported events and likelihood estimates are based on KSGS data for earthquake, and include an analysis for the State average of occurrences.

M = State-mandated planning hazard. (Dam data is provided by the State of Kansas Department of Agriculture-Water Resources, and provides dam “classifications” based on potential downstream damage, and is not an evaluation of dam condition or determination of “likelihood”.)

# 4.2 Risk and Vulnerability

Due to the limitations of capabilities, discussed in other sections, and the overall desire to focus on the key hazards, the participating jurisdictions chose to rank or prioritize the local hazards. As most jurisdictions are just beginning the overall mitigation planning process and are cognizant of the need to focus the available time and effort, the following methods were used to produce the overall priority rankings of the local hazards. Each year the jurisdictions will review and update its available resources and evaluate the benefit of including low or negligible hazards.

The availability of detailed, consistent, and reliable data provided by the National Climatic Data Center (NCDC) allows the calculation of relative risk values for natural weather events. A standardized set of data is routinely tracked by the NCDC for an established inventory of individual natural hazard types. NCDC has tracked this type of data for over 58 years, and has set the standard for developing likelihood and severity for damage events. For this reason, a similar algorithm has been established for other hazards identified in this plan to formulate a hazard risk rating to normalize risk comparison.

The columns in Table 4.1 (3) record information regarding the frequency, and impact (or strength) of the particular natural event and include the following:

- Likelihood (occurrences over time)
- Magnitude (in terms of Fujita Scale, hail diameter, or wind speed)
- Deaths
- Injuries
- Property damage
- Crop damage

This information provides the basis for establishing likelihood and severity ratings. The rate of occurrence is established from the data record time interval and the number of events recorded. These primary factors of severity and likelihood of occurrence provide the basis for calculating hazard risk.

As published in Hazard Identification and Risk Assessment by Geoff Wells (copyright 1996), a reasonable determination of risk may be obtained through the combined calculation of measured severity and the likelihood of occurrence for any particular hazard. Risk Rating can then be defined in the following equation:

Risk Rating (RR) = Severity Index (Si) X Likelihood of Occurrence (Li)

Risk Ratings were calculated for individual weather events and are presented in column 10 of Table 4.1 (3) – Leavenworth County Risk Rating. This table combines the categories of likelihood and vulnerability to obtain the risk rating for each potential hazard.

The following table and figures have been completed to provide a summary of hazard events analysis, and present a broad profile of each hazard relative to one another. Determining the risk rating establishes a numeric ranking for each hazard relative to one another. The risk-rating process is then simplified into the risk index, Table 4.3 (1), which leads to conclusions on hazard risk and forms a basis for prioritizing future mitigation efforts as outlined in this plan.

The columns for Table 4.1 (3) are defined per the following two Figures. These assigned values are taken directly from the NWS data and allow for a direct calculation of overall risk by providing severity and likelihood.

The column labeled Severity Rating, or M, in Table 4.1 (3) is defined by Figure 4.2 (1) which is itself titled Event Magnitude Ratings (M) for natural events. Each event has been assigned a severity rating for magnitude based on the probable impact of the event. Gradational rating systems were employed to allow a more precise determination of magnitude. Where possible, gradational rating systems were developed from widely accepted rating systems currently in use. Gradational rating systems have been established for the following natural events: hail, wind, seismic, and wildfire. Magnitudes for hail events were developed from an assessment of the NCDC severe weather event database and are based on hailstone diameter. Magnitudes for tornado and high wind events are drawn directly from the Fujita Scale and are based on wind speed ranges. Magnitudes for seismic events were assigned relative to the Modified Mercali Index rating system which establishes earthquake magnitudes relative to damage thresholds. Magnitudes for wildfire events were generated through an assessment of the State Fire Marshall Office database and are based on financial loss in terms of appraised value per acre burned.

The columns labeled (D) Death, (I) Injury, (Pd) Property Damage, and (Cd) Crop Damage in Table 4.1 (3) are defined by Figure 4.2 (2) Severity Ratings. All of these categories are common parameters to natural events and are typically captured when recording and reporting natural event data. Death and injury indices are measured in terms of population impacted. Property and crop damage indices are measured in terms of financial loss (dollars). The gradational rating system for population and assets severity indices was established through evaluation of severity categories published in the Geoff Wells text, Hazard Identification and Risk Assessment (1996). These values are assigned based on the parameters listed in

the body of the matrix which is in the last column.

Table 4.1 (3) uses all this data to calculate the Likelihood, total a Severity value, and then uses the formula of Likelihood X Severity = Risk to produce a risk or vulnerability value for each local hazard.

*The data in images 4.2 (1) and 4. 2 (2) are either NOAA provided ratings or calculated ratings.*

FIGURE 4.2 (1) MAGNITUDE RATINGS

| Weather Event | Criteria | 0.5 | 1 | 2 | 3 | 4 | 5 | Rating |
|---|---|---|---|---|---|---|---|---|
| Earthquake (MMI) | IV | X | | | | | | 0.5 |
| Earthquake (MMI) | V | | X | | | | | 1 |
| Earthquake (MMI) | VI-VII | | | X | | | | 2 |
| Earthquake (MMI) | VIII | | | | X | | | 3 |
| Earthquake (MMI) | IX-X | | | | | X | | 4 |
| Earthquake (MMI) | XI-XII | | | | | | X | 5 |
| Excessive Heat | XI-XII | | | X | | | | 2 |
| Extreme Windchill | XI-XII | | | | X | | | 3 |
| Flash Flood | XI-XII | | | | | | X | 5 |
| Flood | XI-XII | | | | | X | | 4 |
| Hail | <0.75 in dia | X | | | | | | 0.5 |
| Hail | >.75 - 1.0 in dia | | X | | | | | 1 |
| Hail | >1.0 - 1.25 in dia | | | X | | | | 2 |
| Hail | >1.25 - 1.5 in dia | | | | X | | | 3 |
| Hail | >1.5 - 2.0 in dia | | | | | X | | 4 |
| Hail | >2.0 in dia | | | | | | X | 5 |
| Heavy Snow | >2.0 in dia | | | | X | | | 3 |
| Ice Storm | >2.0 in dia | | | | | X | | 4 |
| Tornado | F0 | X | | | | | | 0.5 |
| Tornado | F1 | | X | | | | | 1 |
| Tornado | F2 | | | X | | | | 2 |
| Tornado | F3 | | | | X | | | 3 |
| Tornado | F4 | | | | | X | | 4 |
| Tornado | F5 | | | | | | X | 5 |
| Tstm Wind(s); Thunderstorm Wind(s) | 40-72 mph / 35-62 knots | X | | | | | | 0.5 |
| Tstm Wind(s); Thunderstorm Wind(s) | 73-112 mph / 63-97 knots | | X | | | | | 1 |
| Tstm Wind(s); Thunderstorm Wind(s) | 113-157 mph / 98-136 knots | | | X | | | | 2 |
| Wild/forest Fire | <=1000 | X | | | | | | 0.5 |
| Wild/forest Fire | >4000 - 5000 | | | | | X | | 4 |
| Wild/forest Fire | >1000 - 2000 | | X | | | | | 1 |
| Wild/forest Fire | >2000 - 3000 | | | X | | | | 2 |
| Wild/forest Fire | >3000 - 4000 | | | | X | | | 3 |
| Winter Storm | >3000 - 4000 | | | X | | | | 2 |
| Wild/forest Fire | >5000 | | | | | | X | 5 |

FIGURE 4.2 (2) SEVERITY RATINGS

| Parameter | 0.5 | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| Death (D) | 0 | 1 | > 1 - 5 | > 5 - 10 | > 10 - 50 | > 50 |
| Injury (I) | 1 | > 1 - 10 | > 10 - 50 | > 50 - 100 | > 100 - 500 | > 500 |
| Property Damage (PrD) | < 10K | < 10K - 100K | < 100K - 1M | < 1M - 10M | > 10M - 100M | > 100M |
| Crop Damage (CrD) | < 10K | < 10K - 100K | < 100K - 1M | < 1M - 10M | > 10M - 100M | > 100M |

## 4.2.1 Likelihood of Occurrence

The data record time interval is determined from the difference between the beginning and ending dates of the record inventory. For natural hazard data, the data record time varies from approximately 15 years to 58 years. (EFM updates its overall NCDC database every three years.) Table 4.1(3) provides the data record time in the “#Years” column. The total number of individual weather events can be extracted from

the inventory of data. Given this information, likelihood of occurrence (in units of events/year) for a particular weather event is calculated as the quotient of the number of weather events as the numerator and data record time interval as the denominator. Similar data is extrapolated for other hazards.

Likelihood of Occurrence (Li) = Number of Events / data record time interval (years).

Risk ratings for other types of hazards may be determined on the availability of historical frequency data and a subjective assessment of predicted severity.

E-Fm updates the national weather data on a three-year basis. In some cases the reported number of hazard events in E-Fm's Risk Rating Table may vary from data found on the NCDC Storm Event Reporting Tool.

The NCDC also reports certain types of storm events, such as blizzards, in regions or "zones", and as a consequence does not attribute certain hazard events to individual counties. To increase the accuracy of individual county event reporting, E-Fm's algorithm adjusts for the zone factor and attributes the events to each county that is included in the zone.

### 4.2.2 Severity Rating

Severity rating tables were established for each of the standard data categories tracked by the NCDC and assigned a lower limit of 0.5 and an upper limit of 5.0. From these tables, severity ratings were derived for each of the possible natural events. The severity ratings are identified as follows:

- Magnitude Sr (M)
- Death Sr (D)
- Injury Sr (I)
- Property damage Sr (Pd)
- Crop damage Sr (Cd)

The Severity Index (Si) for a particular event (Column 9 in Table 4.1 (3)) is calculated as the sum of the five individual Severity ratings (Sr).

### 4.2.3 Other Likelihood and Severity Values

Kansas Wildfire Risk Rating Procedure

The State Fire Marshal's Office has required counties to formally report wild/rangeland fires since 1997. A summary of the database, by county, was provided to E-Fm for use in developing a severity and risk rating for this hazard event. Relatively little historical data was available, making a comparative analysis to other hazard events difficult. It was necessary to develop an events/time baseline for comparison of wildfire to other reported hazard events. To obtain the desired results, the consultant normalized existing data to more closely resemble reporting patterns found in the NCDC database, and expands the time element of the wildfire reporting data. Our target was to predict data for the time period of approximately 1950 to 2002.

The Plan Author compiled a state-wide database from all reported NCDC weather events since 1950 to develop the annual reporting events for the State of Kansas. This data was then sorted by year and analyzed utilizing exponential smoothing of the data. This is an accepted methodology to produce a smoothed Time Series. Comparatively, in single moving averages, the past observations are weighted equally, exponential smoothing assigns exponentially decreasing weights as the observations get older. In other words, recent observations are given relatively more weight in forecasting than the older observations. Based on the review of weather data, the assumption that wildfire reporting would follow a similar pattern was adopted.

In the case of moving averages, the weights assigned to the observations are the same and are equal to 1/N. In exponential smoothing, however, there are one or more smoothing parameters to be determined

(or estimated) and these choices determine the weights assigned to the observations. For this analysis, 0.25 was used as the damping factor to eliminate unwanted cyclical and irregular variations. The result was a representative curve which could be used to predict past reporting of wildfire data.

The seven years of county data was averaged and used as the maximum value on the curve. The exponential curve was applied using this maximum value and individual yearly data were produced. This process provided a longer reporting period which effectively lowered the overall likelihood value and placed the risk rating for wildfires in a more usable range.

For more information regarding risk and vulnerability analysis reference Leavenworth County's Hazard Analysis.

Seismic Risk Rating

Advances in technology, coupled with numerous federal, state and local research institutions have increased our awareness and understanding of seismic events through monitoring and tracking seismic activity across the country. There are two generally accepted methods for measuring the strength of a seismic event. The Richter scale is the most common method used by seismologists to quantify the magnitude of an earthquake. The modified Mercalli Scale (MMI) provides a semi-quantitative method for expressing earthquake intensity and is based on the type and amount of damage caused by the earthquake and the observations of people within the area where the activity is felt. By comparative conversion of the Richter and Mercalli measurements, in conjunction with past-recorded events and the seismic zone rating map of the United States, it possible to develop relative probability of occurrence for seismic events in tandem with its anticipated severity.

An objective assessment of this information will be made to determine the best available data for risk calculation. Likelihood of Occurrence will be measured in units of events/year. In cases where local or regional data is unavailable, state averages for occurrence frequencies will be used. Risk ratings for other hazards may be based on the availability of historical frequency data and a subjective assessment of predicted severity. Seismic event (earthquake) likelihood is based on statewide recorded events across a database timeframe of ~110 years.

## 4.3 Risk and Vulnerability Index

*Multihazard Requirement §201.6(c)(2)(ii): [The risk assessment shall include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community.*

In order to accomplish the final relative priority ranking, a statistical analysis of the Risk Ranking values was undertaken for a representative number of values from across the state. The analysis was used to produce quadrants which could be used to identify the highest ranking through the lowest ranking hazards. The graphing of the data produced the normal curve of values and the three interior break points (changes in the slope of the curve) were identified. The analysis suggested the following values as dividing lines to form four ranking quadrants. The jurisdictions agreed to use the following definitions based on the Risk Ranking value analysis.

- High Risk = 5.0 or greater
- Moderate Risk = 1.00 to 5.0
- Low Risk = 0.76 - 0.99
- Negligible Risk = less than 0.75

Risk Index: reference the methodology section for greater detail in development of hazard risk-ratings for the identified hazards. For ease of interpretation in this format the Hazard Risk Index Ratings are based on either:

- 1 = High Risk

- 2 = Moderate Risk
- 3 = Low Risk
- 4 = Negligible

### TABLE 4.3 (1) LEAVENWORTH HAZARD RISK INDEX

TABLE 4.3 (1) LEAVENWORTH HAZARD RISK INDEX

| Hazard | Relative Risk Rating | Hazard Risk Index Rating |
|---|---|---|
| Flood | 47.13 | 1 |
| Hail | 31.13 | 1 |
| Wildfire | 22.04 | 1 |
| Winter Storm | 8.43 | 1 |
| TSTM Wind | 7.93 | 1 |
| Excessive Heat | 4.2 | 2 |
| Tornado | 3 | 2 |
| Dam/Levee | 1 | 2 |
| Terrorism / AT / CD | 1 | 2 |
| Utility Failure | 1 | 2 |
| Earthquake | 0.68 | 4 |

Table Footnote: M - State Mandated

## 4.3.1 Leavenworth County Hazards Index

In many cases, the hazards common to the State Plan and Leavenworth County's hazard assessment were determined to be low or negligible risk, and as a consequence, are not included as primary planning risks for the county. The focus of this mitigation plan is natural hazards, and also includes State-required planning hazards for Utility Failure, Terrorism/Agri-terrorism/Civil Disorder, and Dams/Levees planning requirements.

Leavenworth County, Kansas, is faced with the following prioritized hazards and potential hazardous events. For the purposes of this planning event, Leavenworth County has elected to only address the hazards classified as high and moderate, based on severity and frequency of occurrence. The results are presented in the following table:

### Table 4.3.1 (1) NATURAL HAZARDS PRIORITIZATION (High, Moderate, Low, Negligible)

Table 4.3.1 (1) NATURAL HAZARDS PRIORITIZATION (High, Moderate, Low, Negligible)

| High Risk | Moderate Risk | Low Risk | Negligible Risk |
|---|---|---|---|
| Flood | Excessive Heat | | Earthquake |
| Hail | Tornado | | |
| Wildfire | Dam/Levee | | |
| Winter Storm | Terrorism / AT / CD | | |
| TSTM Wind | Utility Failure | | |

## 4.3.2 Conclusions on Hazard Risk

Based upon the completion of the hazard identification and analysis, hazards of significance have been classified as high or moderate. A majority of these hazards impact the entire county and are considered

multijurisdictional hazards. FEMA and the State of Kansas has further delineated Flood, Dams/Levees, and Wildfire as hazards that vary across the planning area, and will be addressed as such in this plan. These classifications will be used as a basis for concentrating and prioritizing current and future mitigation efforts.

A summary of hazards is provided in Table 4.3.2 (1) for jurisdictions included in the Leavenworth County Plan.

### TABLE 4.3.2 (1) LEAVENWORTH COUNTY HAZARDS SUMMARY

TABLE 4.3.2 (1) LEAVENWORTH COUNTY HAZARDS SUMMARY

| | Dam / Levee | Excessive Heat | Flood | Hail | Terrorism / AT / CD | Tornado | TSTM Wind | Utility Failure | Wildfire | Winter Storm |
|---|---|---|---|---|---|---|---|---|---|---|
| Leavenworth (UnInc.) | X | X | X | X | X | X | X | X | X | X |
| Basehor | | X | X | X | X | X | X | X | | X |
| Easton | | X | X | X | X | X | X | X | | X |
| Lansing | X | X | X | X | X | X | X | X | | X |
| Leavenworth | | X | X | X | X | X | X | X | | X |
| Linwood | | X | X | X | X | X | X | X | | X |
| Tonganoxie | | X | X | X | X | X | X | X | | X |
| University of St. Mary | | X | | X | X | X | X | X | | X |
| USD 449 | | X | | X | X | X | X | X | | X |
| USD 453 | | X | | X | X | X | X | X | | X |
| USD 458 | | X | X | X | X | X | X | X | | X |
| USD 464 | | X | | X | X | X | X | X | | X |
| USD 469 | | X | | X | X | X | X | X | | X |

## 4.4 Moderate / High Hazard Profiles

*Multihazard Requirement §201.6(c)(2)(i): [The risk assessment shall include a] description of the … location and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.*

A descriptive analysis follows with the general hazard profile, history and jurisdiction impacts, location and extents, and probability of occurrence for the significant hazards identified in Leavenworth County. Historical records are used to help identify the level of risk, with the methodological assumption that the data sources cited are reliable and accurate.

Due to its unique geographical setting, Leavenworth County is vulnerable to a wide array of natural and manmade phenomena that pose a threat to life and property. This multi-jurisdictional mitigation plan is

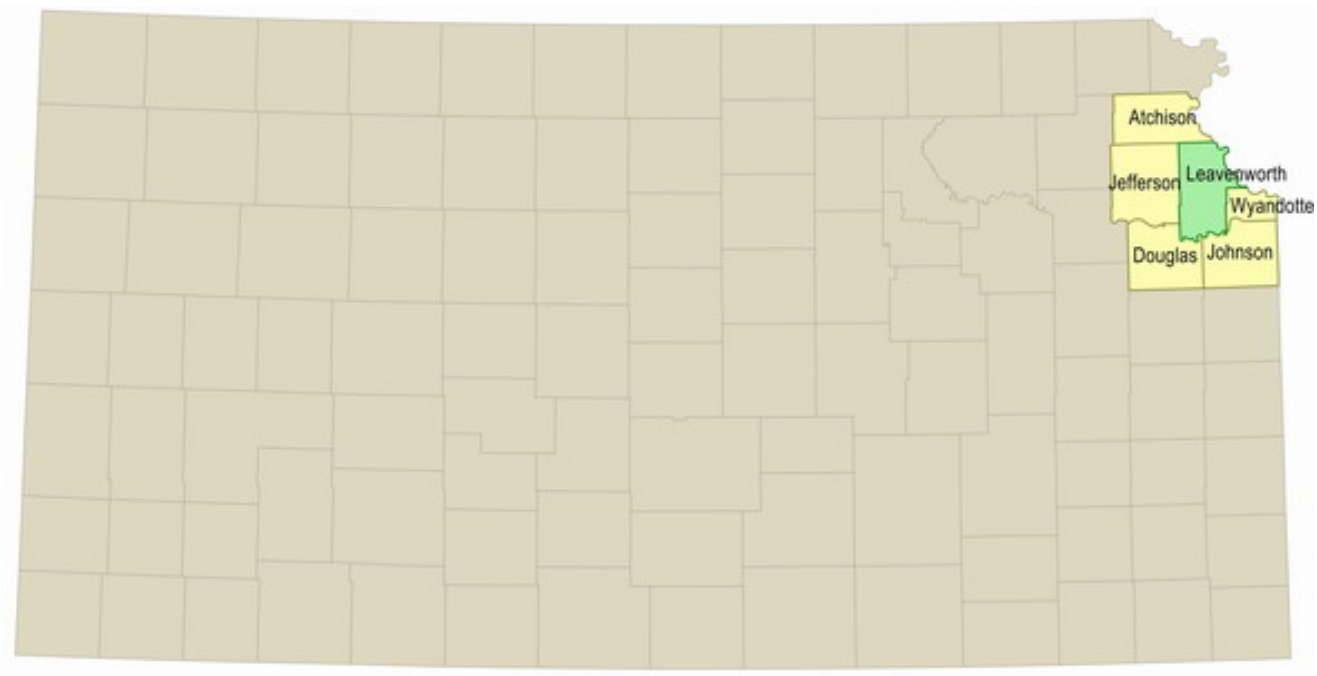
developed to address only the high and moderate hazards classified in the hazard/risk assessment. Other hazards identified during the assessment which were classified as low or negligible were statistically eliminated from priority planning based on the probability (likelihood) and vulnerability (severity) of these hazard events.

### Leavenworth County Profiles

Some hazards common to the State Plan and Leavenworth County's hazard assessment were determined to be low or negligible risk, and as a consequence, are not included as primary planning risks for the county. The focus of this mitigation plan is natural hazards, and also includes FEMA and State required planning hazards for Utility Failure, Terrorism/Agri-terrorism/Civil Disorder, and Dams/Levees.

In some instances, local jurisdictions have identified unique hazards not identified at the county level. These hazards are profiled by the specific jurisdiction.

Leavenworth County and Surrounding Counties




## 4.4.1 MultiJurisdictional Hazard Profiles

# Utility Failure

## Hazard Profile

The concept of “cascading hazards” relates to the propensity of a primary or source hazard to spawn or generate additional hazards, commonly known as cascading hazards. On the first level, primary hazards can bring about secondary hazards. Subsequently, secondary hazards may escalate into tertiary hazards and so forth. The extent of cascading hazards is potentially limitless.

Power failure can be defined as any interruption or loss of electrical service due to disruption of power transmission caused by natural hazards (weather events), accident, sabotage, or equipment failure. A significant power failure is defined as power incident which would require the involvement of the local and/or state emergency management organizations to coordinate provision of food, water, heating, shelter, etc. Typically, a power outage is a cascading effect of a larger natural hazard.

In terms of electric power, the cities of Leavenworth, Lansing, Tonganoxie, Basehor, and Linwood, for the most part, are serviced by Westar Energy, with Leavenworth-Jefferson Electric COOP serving unincorporated areas of Leavenworth County.

This hazard deals with the loss of electric power supplied by the local utility providers for potential loss of electricity during severe storms, or ice accumulation on lines causing large areas of power outages within Leavenworth County.

Additionally, this disaster could also cover very high levels of power usage during a severe heat wave that causes a utility company to resort to a series of rolling blackouts in which certain areas would be purposely shut off from power during peak usage times for four to five hours or more.

The failure of larger main electric feeder lines can also result in large area power outages.

Statistical data for analysis at the county level was not readily available, so Leavenworth County utilized pertinent data provided in the State of Kansas Mitigation Plan to quantify this hazard.

## History and Jurisdiction Impacts

The State of Kansas is part of one of four interdependent power grids (Eastern Interconnection) spanning the United States and Quebec, Canada. The electric power grid is a highly interconnected and dynamic system of over 3,000 public and private utilities and rural cooperatives. These utilities have incorporated a wide variety of information and telecommunications systems to automate the control of electric power generation, transmission, and distribution. Due to this interconnectivity, small outages can sometimes create problems on a large scale.

In recent years, regional electric power grid system failures in the western and northeastern United States have demonstrated that similar failures could happen in Kansas. This vulnerability is most appropriately addressed on a multi-state regional or national basis. Another recent concern that could affect the functioning of utilities and infrastructure is cybersecurity.

For the most part, it appears severe winter storms create the most widespread threat to electrical transmission failure in Leavenworth County.

## Location and Extents

Electrical power outages/blackouts or loss of transmission lines are hard to quantify, and are generally unpredictable in nature. Additionally, power outages could have a county-wide impact.

## Probability of Future Occurrences

Statistical data for analysis at the county level was not readily available, so Leavenworth County relied on the data provided in the State of Kansas Mitigation Plan in conjunction with Winter Storm Events to quantify this hazard.

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While utility failures occur annually, this hazard's probability for significant events in Leavenworth County is considered to be moderate.

Although we can extract data and probability of occurrence from historical information, the risk of a severe event occurring and the location of damage appear to be a random event. The likelihood of future events is estimated to remain the same as currently calculated. Leavenworth County can expect approximately one winter storm event every year (1.53 instances/year).

# Excessive Heat

## Hazard Profile

Excessive Heat is characterized by a combination of a very high temperatures and exceptionally humid conditions. When persisting over a period of time, it is called a heat wave.

The major human risks associated with Excessive Heat include heatstroke, heat exhaustion, heat syncope, and heat cramps. Most at risk are outdoor laborers, the elderly, children, and people in poor physical health. The effects of Excessive Heat are always more pronounced in urbanized areas than in rural areas. Within urbanized areas, the problem is exacerbated by what is known as the heat island effect, in which the concrete and metal infrastructure absorbs radiant heat energy from the sun during the day and radiates that heat energy during the night. This cyclical process essentially “traps” the heat in the urbanized area and makes it as much as 10 degrees warmer than the surrounding hinterland.

Excessive Heat is an invisible killer. Although a heat wave does not happen with the spectacle of other hazards such as tornadoes and floods, the National Center for Environmental Health reports that, from 1979 to 1999, excessive heat exposure caused 8,015 deaths in the United States. In other words, during this period, more people in the U.S. died from severe summer heat than from hurricanes, lightning, tornadoes, floods and earthquakes combined.

## History and Jurisdiction Impacts

During the summer months, the State of Kansas is frequently affected by severe heat hazards. Persistent domes of high pressure establish themselves, which set up hot and dry conditions. This high pressure prevents other weather features such as cool fronts or rain events from moving into the area and providing necessary relief. Daily high temperatures range into the upper 90’s and low 100’s. When combined with moderate to high relative humidity levels, the heat index moves into dangerous levels, and a heat index of 105 degrees is considered the level where many people begin to experience extreme discomfort or physical distress.

July 18, 1999, oppressive heat and humidity gripped northeast Kansas for nearly two-weeks in late July. Temperatures exceeded 90-degrees across the area on fourteen consecutive days, and flirted with the 100-degree mark on eight of those days, from July 23-30. High humidity levels pushed afternoon heat indices over 100, and even as high as 115 at the peak of the heat wave on July 29 and 30. There was was no property or crop damage reported, and no deaths or injuries in Leavenworth County for the July 18th event.

July 21, 2005, oppressive heat and humidity was observed across the area from July 21st to July 25th. Afternoon heat indices ranged from 105 to 110 degrees. There was no property or crop damage reported, and no deaths or injuries in Leavenworth County for the July 21st event.

August 1, 2006, oppressive heat and humidity continued from July; with heat indices in the 105 to 115 degree range through August 2nd. There was no property or crop damage reported, and no deaths or injuries in Leavenworth County for the August 1st event.

## Location and Extents

There is no distinct geographic boundary to Excessive Heat. Excessive Heat can occur in every area of the county equally. While Leavenworth County buildings, critical facilities, infrastructure and lifelines, and hazardous materials facilities may be exposed to Excessive Heat and could potentially be impacted, it is expected that the greatest exposure to this hazard is on the population of Leavenworth County rather than impacting physical County assets.

## Probability of Future Occurrences

The likelihood or future probability of a significant occurrence of Excessive Heat in the county is

considered moderate. The county can expect one event every year (annual probability of 0.93).

Although we extract data and probability of occurrence from historical data, the risk of excessive heat occurring, and the location of damage, appear to be random.

## Terrorism / AT / CD

Hazard Profile

Vector-based hazards have become an "emerging" threat to the state, local governments, and its citizens. Insects, infectious diseases, and naturally-occurring and manmade biological agents can pose a direct or indirect hazard to humans, livestock, and the state's economy. The State of Kansas has made this hazard a priority for the State and local government planning requirements.

Numerous definitions for “vector” have been proposed, and vary with the nature and focus of the specific discipline of research such as epidemiology, public health, mathematics, and most recently - Emergency Management. This section will focus primarily on Emergency Management’s role with infectious Foreign Animal Disease (FAD), biological agents, and/or by-products utilized to create weapons of mass destruction (WMD), which could otherwise require a response from emergency management departments.

Other forms of communicable disease and biological/chemical agents are causes for concern. However, authority and response to these potential health issues resides with agencies and disciplines such as the Food and Drug Administration (FDA), Center for Disease Control (CDC), and Public Health Departments, and therefore will not be mentioned in this section. Emergency Management roles and responsibilities will likely change with time requiring refinement and expansion of response for this discipline.

Potential threats to U.S. agriculture and livestock can arise from a variety of pathogens and causative agents. Terrorist attacks against agricultural assets might be tempting, due to the perceived relative ease of attack, the plausible deniability toward accusations, and the limited number of plant seed varieties in use. Highly infectious naturally-occurring plant and animal pathogens exist outside the U.S. borders, and some agents are readily transported, inadvertently or intentionally, with little risk of detection.

Nature has already shown how easy it might be for a sophisticated, technically-informed state, group, or individual to attack crops and livestock by introducing a new parasite, predator, or disease. There are a host of “rusts” and “smuts” that can attack grain crops, as evidenced by past naturally-occurring events in the U.S.

The list of threats (exotic diseases) to livestock is substantial. They include, but are not limited to, animal disease, plant disease, Foot and Mouth Disease (FMD), vesicular stomatitis, Bovine Spongiform Encephalopathy (BSE), rinderpest, gibberella, African swine fever, highly pathogenic avian influenza, Rift Valley fever, lumpy skin disease, blue tongue, sheep and goat pox, swine vesicular disease, contagious bovine pleuropneumonia, Newcastle disease, African horse sickness, and classical swine fever.

Animal health officials define an exotic or FAD as an important transmissible livestock or poultry disease believed to be absent from the United States and its territories, and capable of generating potential significant health or economic impact. FMD, anthrax, BSE, rinderpest, and swine fever are potential ways to attack livestock.

History and Jurisdiction Impacts

Although terrorist-type activities/incidences are a relatively new type of threat to Kansas, these types of activities, if present, are not readily available or reported to the public. Leavenworth County has not documented terrorist activities in their county, but the State of Kansas has made this hazard a priority for the State and local government planning requirements. Federal and state officials understand local-level resources will be the first to respond to any emergency situation and have acknowledged the fact that local planning and preparation, even if resources are exhausted quickly, will play a major role in mitigating a terrorist attack or outbreak of an exotic disease. Research suggests the best approach is to broaden the prevention, response and recovery spectrum for emergency operations planning to include all hazards, with the understanding that limited resources and funding at the local level will require quick evaluation

of an event in order to efficiently respond to the emergency and to obtain state and federal assistance in a timely fashion.

The Department of Homeland Security required all states and local jurisdictions to update their terrorist security databases in 2003. Leavenworth County provided a self-assessment of risk and vulnerability during this planning event. Additionally, the State of Kansas required all jurisdictions to plan for potential bio-terrorism events, and develop local foreign animal disease plans. As a result, Leavenworth County has selected this hazard category as a priority for inclusion in the county's Mitigation Plan, as the role of emergency management will be fine tuned for prevention, response, and recovery activities involving a FAD and/or bio-terrorist event to provide the resource support needed to effectively and efficiently deal with the disease onset and lifespan.

Location and Extents

The entire county is considered equally susceptible to Terrorism.

Probability of Future Occurrences

Although initial detection of this type of event is considered uncontrollable, it is highly possible an act of terrorism (domestic or other) could occur at any time given the right circumstances. However, the probability of future occurrence is reduced due to proactive preventative action on the part of Federal, State and local authories. This proactive approach to preparation and prevention will help reduce the potential for losses to property and life as a result of terrorist or FAD outbreaks.

Although there is no historical information, the risks associated with Terrorism appear to be a random event with a low risk probability, but is included in the plan as a state-mandated planning hazard.

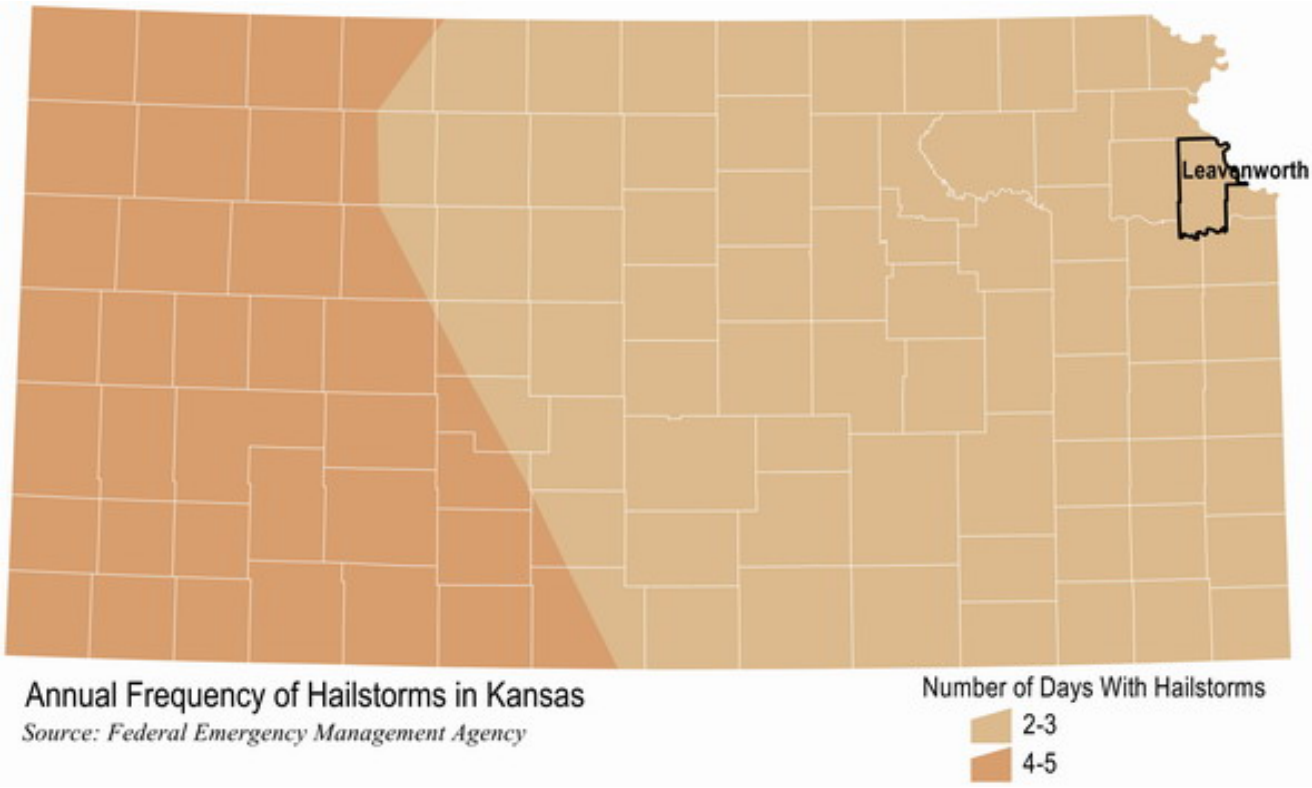
# Hail

## Hazard Profile

Hail can be produced from many different storm types. Typically, hail is a cascading hazard of a thunderstorm event. It is estimated that damage from hail approaches $1 billion in the U.S. annually. U.S. agriculture is typically the most affected by such hail storms. Hail causes severe crop damage and even a minor storm with relatively small-size hailstones can have a devastating effect. Damage to vehicles, roofs (residential/commercial), and landscaping are the other things most commonly damaged by hail, according to the National Weather Service (NWS) and National Oceanic and Atmospheric Administration (NOAA).

Early in the developmental stages of a hailstorm, ice crystals form within a low-pressure front due to the rapid rising of warm air into the upper atmosphere and the subsequent cooling of the air mass. Frozen droplets gradually accumulate on the ice crystals until, having developed sufficient weight, they fall as precipitation—as balls or irregularly shaped masses of ice greater than 0.75 in. (1.91 cm) in diameter. The size of hailstones is a direct function of the size and severity of the storm. High velocity updraft winds are required to keep hail in suspension in thunderclouds. The strength of the updraft is a function of the intensity of heating at the Earth's surface. Higher temperature gradients relative to elevation above the surface result in increased suspension time and hailstone size. Figure 1 shows the annual frequency of hailstorms in the State of Kansas.

Figure 1 - FEMA Hailstorm Map of Kansas




## History and Jurisdiction Impacts

There were 179 reported hail events in the 46-year recorded time frame for Leavenworth County. No deaths or injuries were attributed to any of the reported events. The National Climatic Data Center (NCDC) reported $1,075,000 in accumulative property damage and $500,000 in crop damages in Leavenworth County.

Seven different hail events have occurred in Leavenworth County that produced hail 2.75 -inches in diameter, which is the largest recorded hail size in for the county.

A 2.75-inch hail event occurred on June 5, 1996, 1 mile west of Basehor dropping baseball-sized hail. There were no reported property or crop damage and no reported deaths or injuries associated with the June 5th event.

A 2.75-inch hail event occurred on March 12, 2006, 2 miles east of Basehor that caused $250,000 in property damage. There were no crop damages reported and no deaths or injuries associated with the March 12th event.

A 2.75-inch hail event occurred on May 1, 2008, where large hail was reported across the county. There was no property or crop damage reported and no deaths or injuries associated with the May 1st event.

Location and Extents

The entire Leavenworth County area is equally susceptible to damage from hail in association with severe thunderstorms.

Probability of Future Occurrences

The probability of a hailstorm event depends on certain atmospheric and climatic changes. The likelihood of future events is estimated to remain the same as currently calculated. Leavenworth County can expect approximately 3.89 instances of hail events per year. Average annual damages from hail storm events are estimated at $27,155.

Although we extract data and probability of occurrence from historical information, the risk of a severe event occurring and the location of damage appears to be a random event.

# Tornado

Hazard Profile

A tornado is a violent windstorm characterized by a twisting, funnel-shaped cloud extending to the ground. It is most often generated by a thunderstorm and produced when cool, dry air intersects and overrides a layer of warm, moist air forcing the warm air to rise rapidly. The damage from a tornado is a result of the high wind velocity and wind-blown debris, although they are commonly accompanied by large hail as well. The most violent tornadoes have rotating winds of 250 miles per hour or more and are capable of causing extreme destruction, including uprooting trees and well-made structures, and turning normally harmless objects into deadly missiles.

Most tornadoes are just a few dozen yards wide and touch down only briefly, but highly destructive tornadoes may carve out a path over a mile wide and several miles long. The destruction caused by tornadoes may range from light to inconceivable depending on the intensity, size and duration of the storm. Typically, tornadoes cause the greatest damages to structures of light construction, such as residential homes, and are quite localized in impact.

Each year an average of 800-1,000 tornadoes are reported nationwide and they are more likely to occur during the spring and early summer months of March through June. Tornadoes can occur at any time of day but are mostly likely to form in late afternoons and early evenings.

The magnitude or severity of a tornado was originally categorized using the Fujita Scale or Pearson Fujita Scale (introduced in 1971). The Fujita Scale categorizes tornadoes from F0 (Gale) to F5 (Inconceivable) based on wind speed. It is used to rate the intensity of a tornado by examining the damage caused by the tornado after it has passed over a manmade structure. Other scales have been developed to measure wind and tornado intensity including the Beaufort Wind Scales (B-Scales) and Britain's Tornado Storm and Research Organization (TORRO) Scale (T-Scale). However, the Beaufort and TORRO scales are generally not used to identify the severity or intensity of a tornado or wind event in the United States.

However, this scale recently become obsolete, due to many weaknesses in the system that have resulted is misuse and/or misunderstanding of the scale. It was replaced on February 1, 2007, by the Enhanced Fujita Scale, or EF Scale (Figure 1). This new scale continues to rate the strength of tornadoes in the United States based on the damage caused. The scale has the same basic design as the original Fujita Scale (six categories from 0 to 5 representing increasing degrees of damage). It was revised to reflect better examinations of tornado damage surveys, to align wind speeds more closely with associated storm damage. As with the Fujita Scale, though, each damage level is associated with a wind speed; the Enhanced Fujita Scale is a damage scale and the wind speeds associated with the damage listed remain unverified and little more than educated guesses. The EF Scale improved on the old scale on many counts - it accounts for different degrees of damage that occur with different types of structures based on how they are designed, both man-made and natural. It also provides much better estimates for wind speeds and sets no upper limit on the wind speeds for the strongest level, EF5 (NOAA-SPC, 2007).

Figure 1- Enhanced Fujita Scale

| Enhanced Fujita Scale Summary | | | |
|---|---|---|---|
| EF Scale Number | Intensity Phrase | Wind Speed (mph) | Type of Damage and Observations |
| EF0 | Light Tornado | 65-85 | Light damage. Peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow-rooted trees pushed over. Confirmed tornadoes with no reported damage (i.e. those that remain in open fields) are always rated EF0. |
| EF1 | Moderate Tornado | 86-110 | Moderate damage. Roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken. |
| EF2 | Significant Tornado | 111-135 | Considerable damage. Roofs torn off well-constructed houses; foundations of frame homes shifted; mobile homes completely destroyed; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground. |
| EF3 | Severe Tornado | 136-165 | Severe damage. Entire stories of well-constructed houses destroyed; severe damage to large buildings such as shopping malls; trains overturned; trees debarked; heavy cars lifted off the ground and thrown; structures with weak foundations blown away some distance. |
| EF4 | Devastating Tornado | 166-200 | Devastating damage. Well-constructed houses and whole frame houses completely leveled; cars thrown and small missiles generated. |
| EF5 | Incredible Tornado | >200 | Total destruction. Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 m (300 ft); steel reinforced concrete structure badly damaged; high-rise buildings have significant structural deformation; incredible phenomena will occur. |

History and Jurisdiction Impacts

There have been 3,494 confirmed tornadoes in Kansas since 1950-2008, resulting in 228 deaths and 2,699 injuries, with total damages estimated at $2,602,507,870. Typically, Kansas' tornadoes can be severe when compared to other parts of the country. Compared with other states, Kansas ranks number four in the country for frequency of tornadoes, third for number of deaths, third for injuries, and third for cost of damages.

According to the National Climatic Data Center, there have been 28 confirmed tornadoes in Leavenworth County since 1952. These have resulted in two deaths, twenty-seven injuries, and approximately $13,240,000 in property damages. The three strongest tornadoes recorded in Leavenworth County had a magnitude of F4. These events occurred May 22, 1952, May 7, 1961, and June 8, 1966.

A tornado with a magnitude of F1 was reported on May 11, 2000, six miles west/southwest of Tonganoxie, which entered southwestern Leavenworth County at around 9:40 pm CDT, 6 miles west-southwest of Tonganoxie. The tornado moved east-northeast and lifted 2 miles north of Basehor at 10:12 pm. The 16 mile long path was as wide as 1/4 mile at times, though the average was around 100 yards wide. In Leavenworth County, 200 homes were affected and six were destroyed. One apartment building suffered roof damage. Thirteen businesses were damaged, and two were destroyed. The Leavenworth County Fairgrounds in Tonganoxie suffered extensive damage, approaching a half-million dollars. Total damage was estimated by County Emergency Management officials at $2.6 million. Thunderstorms developed rapidly south of a cold front in eastern Kansas, and then tracked eastward. While the early evening storms were primarily hail producers, one late evening storm produced a tornado that tracked across southern Leavenworth County, resulting in damage in Tonganoxie. The property damage totaled $2,800,000, with no crop damage, deaths, or injuries reported for the May 11th tornado.

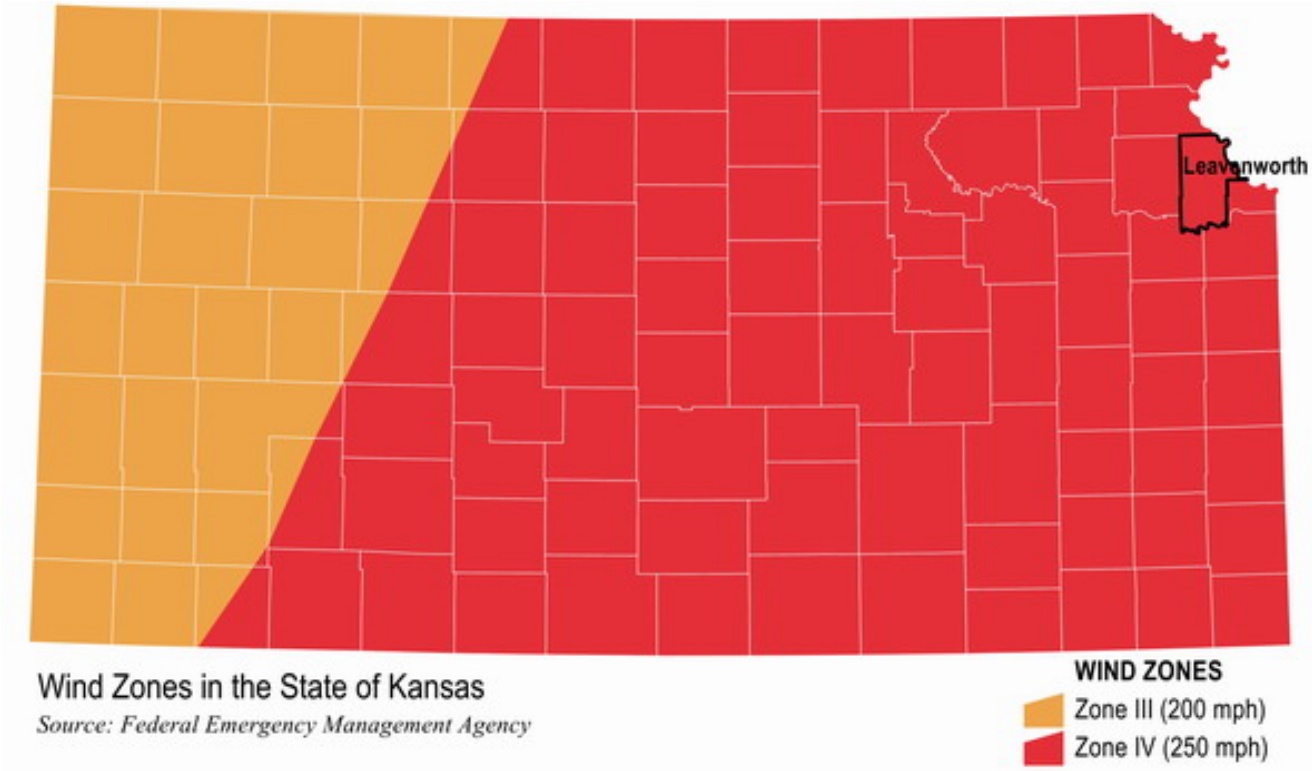
A tornado with a magnitude of F1 was reported on March 30, 1993, briefly in Leavenworth County before

lifting one mile north of Lenape. Property damage was estimated at $500,000 (reported for Leavenworth and Johnson counties), with no crop damage, deaths, or injuries reported for the March 30th twister.

A tornado with a magnitude of F2 was reported on May 4, 2003, 2-miles northwest of Linwood at County Road 25 and Interstate 70. The tornado was reported by Emergency Management and a ham radio operator. Video shows the tornado crossed the Kansas Turnpike east of the Eastern Toll Booth, and then proceeded northeast to where it lifted 2-miles south of Basehor. Total track length was 6 miles, with a width approaching 250 yards. Maxium intensity rating was F2, with most damage noted to homes near, and just northeast of the intersection of 166th and Kansas Avenue. Leavenworth county had 9 homes destroyed, 8 with major damage and 17 with minor damage. Property damage estimates for Leavenworth County are around $4,000,000, but there was no crop damage reported. A 46-year old woman died from injuries received with this tornado; there were also two injuries in association with this tornado event.

The Wind Zones in the State of Kansas (Source: FEMA), depicted in Figure 2, provides an overview of the potential wind strength potential. Leavenworth County lies within Zone IV, with wind speeds capable of up to 250 miles per hour based on past historical data.

Figure 2 - FEMA Wind Zones Map of Kansas




Location and Extents

The damage from a tornado is a result of high wind velocity and wind-blown debris. The potential damage resulting from a tornado is directly correlated to the strength of the particular tornado and is qualified utilizing the Enhanced Fujita Scale. The EF Scale assigns numerical values based on wind speeds and categorizes tornadoes from EF0 through EF5. The Enhanced Fujita Scale is shown in Figure 1.

The entire county is equally susceptible to damage from tornadoes.

Probability of Future Occurrences

The likelihood of future events is estimated to remain the same as currently calculated. Leavenworth

County can expect a tornado every 2 years (0.50 expectancy of occurrence during a single year) with expected damage of $228,275 per year.

Although we extract data and probability of occurrence from historical information, the risk of a tornado occurring and the location of damage appear to be a random event.

Fig. 3 shows the reported tornadoes for Leavenworth County since 1952. Due to the number of thunderstorms Leavenworth County experiences per year, there is a moderate risk of tornadoes.

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## Figure 3 - Historical Tornado Report

Figure 3 - Historical Tornado Report

| Date | Time | Mag | Dth | Inj | PrD | CrD |
|---|---|---|---|---|---|---|
| 5/22/1952 | 5:25 PM | 4 | 0 | 0 | $250,000 | $0 |
| 6/21/1952 | 7:00 PM | 2 | 0 | 0 | $25,000 | $0 |
| 6/18/1956 | 6:20 AM | 2 | 0 | 0 | $2,500 | $0 |
| 11/17/1958 | 10:20 AM | 2 | 0 | 0 | $2,500 | $0 |
| 11/17/1958 | 11:15 AM | 0 | 0 | 0 | $0 | $0 |
| 5/7/1961 | 3:00 PM | 0 | 0 | 0 | $0 | $0 |
| 5/7/1961 | 3:15 PM | 4 | 0 | 0 | $2,500,000 | $0 |
| 5/27/1962 | 3:45 PM | 2 | 0 | 0 | $2,500 | $0 |
| 4/12/1964 | 4:00 PM | 3 | 1 | 22 | $2,500,000 | $0 |
| 4/10/1965 | 2:15 PM | 3 | 0 | 0 | $25,000 | $0 |
| 6/8/1966 | 7:15 PM | 2 | 0 | 0 | $25,000 | $0 |
| 6/8/1966 | 8:00 PM | 4 | 1 | 2 | $250,000 | $0 |
| 5/18/1971 | 1:45 PM | 2 | 0 | 0 | $25,000 | $0 |
| 5/23/1981 | 3:15 PM | 0 | 0 | 0 | $250 | $0 |
| 10/31/1984 | 7:40 PM | 1 | 0 | 1 | $250,000 | $0 |
| 3/30/1993 | 6:19 PM | 1 | 0 | 0 | $500,000 | $0 |
| 5/6/1993 | 7:26 PM | 0 | 0 | 0 | $5,000 | $0 |
| 7/4/1995 | 2:35 PM | 0 | 0 | 0 | $4,000 | $0 |
| 6/5/1996 | 8:41 PM | 0 | 0 | 0 | $0 | $0 |
| 6/5/1996 | 8:41 PM | 1 | 0 | 0 | $250,000 | $0 |
| 5/11/2000 | 8:40 PM | 1 | 0 | 0 | $2,600,000 | $0 |
| 5/8/2002 | 5:43 PM | 0 | 0 | 0 | $1,000 | $0 |
| 5/8/2002 | 5:48 PM | 1 | 0 | 0 | $12,000 | $0 |
| 5/4/2003 | 2:54 PM | 1 | 0 | 0 | $0 | $0 |
| 5/4/2003 | 2:55 PM | 2 | 0 | 2 | $4,000,000 | $0 |
| 3/12/2006 | 8:20 AM | 0 | 0 | 0 | $10,000 | $0 |
| 4/15/2006 | 7:05 PM | 0 | 0 | 0 | $0 | $0 |
| 4/15/2006 | 7:20 PM | 0 | 0 | 0 | $0 | $0 |
| 6/12/2008 | 7:05 PM | 0 | 0 | 0 | $0 | $0 |
| 4/25/2009 | 5:35 PM | 1 | 0 | 0 | $400,000 | $0 |

*Source: National Climatic Data Center*

*Mag: Magnitude* *Dth: Death* *Inj: Injury*

*PrD: Property Damage* *CrD: Crop Damage*

# TSTM Wind

## Hazard Profile

High winds are generally the result of severe thunderstorms. Straight-line winds, which in extreme cases have the potential to exceed 100 miles per hour, are responsible for most thunderstorm wind damage. One type of straight-line wind, the microburst, can cause damage equivalent to a strong tornado and can be extremely dangerous to aviation. Thunderstorms are also capable of producing tornadoes and heavy rain that can lead to flash flooding.

A severe thunderstorm is defined by the National Weather Service as a storm that has a wind velocity of 58 miles per hour or higher, or produces hail at least three-quarters of an inch in diameter, or produces a tornado(es). Thunderstorms simply require moisture to form clouds and rain, coupled with an unstable mass of warm air that can rise rapidly. Thunderstorms affect relatively small areas when compared with hurricanes and winter storms; the average storm is 15 miles in diameter and lasts an average of 30 minutes. Nearly 1,800 thunderstorms are occurring at any moment around the world. However, of the estimated 100,000 thunderstorms that occur each year in the United States, only about 10 percent are classified as severe. Thunderstorms are most likely to happen in the spring and summer months and during the afternoon and evening hours, but can occur year-round and at all hours.

Despite their small size, all thunderstorms are dangerous and capable of threatening life and property in localized areas. Every thunderstorm produces lightning, which results from the buildup and discharge of electrical energy between positively and negatively charged areas. Each year, lightning is responsible for an average of 93 deaths (more than tornadoes), 300 injuries, and several hundred million dollars in damage to property and forests across the United States.

## History and Jurisdiction Impacts

Severe thunderstorms and high wind events are very common in Kansas, and cause a significant amount of property and crop damage annually.

According to the National Climatic Data Center, there were a total of 140 reported severe thunderstorm wind events in Leavenworth County during the period of 1955 to 2008, causing approximately $1,308,000 in property damage. Damages recorded included-downed trees and damaged roofs and structures (these events do not include tornadoes, as this hazard is discussed separately).

July 1, 1994, thunderstorm winds of up to 69 knots downed trees onto cars, homes and power lines across northern Leavenworth County. In Tonganoxie, the winds blew in the fronts of several stores. There was $550,000 in property damages, with no reported crop damage, deaths, or injuries with the July 1st event.

April 16, 1995, severe thunderstorms produced winds of 60 mph or greater west and north of Linwood. Numerous trees were uprooted across the area, and a barn and a mobile home were destroyed four and one-half miles north of Linwood. There was $300,000 in property damages reported, with no crop damage, deaths, or injuries for the April 16th event.

May 30, 1999, thunderstorm winds downed trees and limbs in Tonganoxie, Basehor, and Leavenworth. A school under construction in Basehor suffered damage when a 22-foot reinforced wall was blown over. Wind gusts of up to 65 mph were reported; total property damage was $100,000, with no crop damage, deaths, or injuries reported for the May 30th event.

## Location and Extents

The entire planning area is equally susceptible to damage from thunderstorm high wind (TSTM Wind).

## Probability of Future Occurrences

The probability of a thunderstorm event depends on certain atmospheric and climatic changes. The

likelihood of future events is estimated to remain the same as currently calculated. Leavenworth County can expect approximately 2.64 instances of thunderstorm wind events per year. Average annual damages from thunderstorm events and high wind events are estimated at $22,551.

Although we extract data and probability of occurrence from historical information, the risk of a severe event occurring and the location of damage appear to be a random event.

# Winter Storm

## Hazard Profile

Severe Winter Storms can produce an array of hazardous weather conditions, including heavy snow, ice storms,

freezing rain and ice pellets, high winds and extreme cold. Severe Winter Storms are usually fueled by strong temperature gradients and an active upper-level cold jet stream. Winter Storms can paralyze a community by shutting down normal day-to-day operations, as accumulating snow and ice result in downed trees, power outages and blocked or hazardous transportation routes. Heavy snow can also lead to the collapse of weak roofs or unstable structures. Frequently the loss of electric power means loss of heat for residents, which poses a significant threat to human life, particularly the elderly.

The level of impact severe winter weather will have upon a community greatly depends on its ability to manage and control the effects, such as the rapid mobilization of snow removal equipment. Severe winter weather is a frequent occurrence in Kansas, and can reach blizzard proportions under the right weather conditions. Many Kansas counties are small, and the costs to acquire and maintain the necessary resources to combat winter storm effects is expensive, hence, many small communities are not prepared for such events.

## History and Jurisdiction Impacts

Severe Winter Storms are typically associated with cold climates; but it is not uncommon for the State of Kansas to experience significant and even disastrous winter weather events. In most instances,these impacts are determined by weather patterns and cannot be readily identified to particular regions of the state.

Leavenworth County averages 14.8 inches of snow per year and experiences severe winter storms on occasion, with 23-winter storm/ice events recorded since 1993. Three Winter Storm events are described as follows:

December 6, 1994, a prolonged period of heavy freezing rain occurred with ice accumulation from 0.5 to 0.75 inches on exposed objects, including trees, automobiles, and power lines. Nearly 90-percent of residents across the region were without power at some time. Phone and cable television service was also out. Some damage also occurred to homes and vehicles when trees or limbs fell on them. Some minor fires were also started by downed lines. Some areas were without power for seven days. There was $400,000 in property damage (reported for four counties), with no crop damage and no deaths or injuries reported for this event.

December 21, 1997, the combination of rain and subfreezing temperatures caused icy roads and numerous

traffic accidents. There was no property or crop damages, and no deaths or injuries reported for the December 21st event.

January 30, 2002, a long-lived major ice and snow storm blasted January 29th through January 31st. Ice accumulations of one to two inches were observed with snow accumulations of six to ten inches. The results of the storm were devasting to many communities. A tremendous amount of people were without power for extended periods of times, due to downed trees and tree limbs crippling power supplies in the affected areas. $9,500,000 in property damages were reported (for five counties), with no crop damage, deaths, or injuries reported for the event.

## Location and Extents

The entire county is equally susceptible to damage from Severe Winter Storms.

Probability of Future Occurrences

The probability of a Severe Winter Storm event depends on winter weather patterns that pass through the state. The likelihood of future events is estimated to remain the same as currently calculated. Leavenworth County can expect approximately 1.53 major winter storm events per year. Average annual damages from ice storms/winter storms are estimated at $175,344.

Although we can extract data and probability of occurrence from historical information, the risk of a severe event occurring and the location of damage appear to be a random event.

### 4.4.2 Jurisdiction Hazard Profiles

# Flood - Leavenworth (UnInc.)

Hazard Profile

Flooding is the most frequent and costly natural hazard in the United States. Floods are generally the result of excessive precipitation, and can be classified under two categories: flash floods, the product of heavy localized precipitation in a short time period over a given location; and general floods, caused by precipitation over a longer time period and over a given river basin. The severity of a flooding event is determined by a combination of stream and river basin topography and physiography, precipitation and weather patterns, recent soil moisture conditions and the degree of vegetative clearing.

Flash flooding events usually occur within minutes or hours of heavy amounts of rainfall, from a dam or levee failure, or from a sudden release of water held by an ice jam. Most flash flooding is caused by slow-moving thunderstorms in a local area or by heavy rains associated with hurricanes and tropical storms. Although flash flooding occurs often along mountain streams, it is also common in urbanized areas where much of the ground is covered by impervious surfaces.

General floods are usually longer-term events and may last for several days. The primary types of general flooding include riverine flooding, coastal flooding, and urban flooding. Riverine flooding is a function of excessive precipitation levels and water runoff volumes within the watershed of a stream or river. Coastal flooding is typically a result of storm surge, wind-driven waves, and heavy rainfall produced by hurricanes, tropical storms, nor’easters and other large coastal storms. Urban flooding occurs where man-made development has obstructed the natural flow of water and/or decreased the ability of natural groundcover to absorb and retain surface water runoff.

Periodic flooding of lands adjacent to rivers, streams and shorelines is a natural and inevitable occurrence that can be expected to take place based upon established recurrence intervals. The recurrence interval of a flood is defined as the average time interval, in years, expected between a flood event of a particular magnitude and an equal or larger flood. Flood magnitude increases with increasing recurrence interval.

A "floodplain" is the lowland area adjacent to a river, lake or ocean. Floodplains are designated by the frequency of the flood that is large enough to cover them. For example, the 10-year floodplain will likely be covered once every 10-years, and the 100-year floodplain covered once every 100-years.

Flood frequencies, such as the "100-year flood," are determined by plotting a graph of the size of all known floods for an area and determining how often floods of a particular size occur. Another way of expressing the flood frequency is the chance of occurrence in a given year, which is the percentage of the probability of flooding each year. For example, the 100-year flood has a 1% chance of occurring in any given year.

History and Jurisdiction Impacts

According to the National Climatic Data Center, there were a total of 101 reported flood events in Leavenworth County during the period of 1993 to 2008. Three events are described as follows:

On May 30, 1995, floods were caused by abnormally heavy rainfall through the month. Most farmers did not even get into the fields to plant, and those who did saw their early crops flooded out. Several roads were damaged by the high water across the region with costs at about $150,000. Damage to recreational areas and state facilities was estimated at nearly $200,000. Total damage to agriculture, which includes crops already planted and delays to planting causing yield losses, was estimated at around $500,000. There were no deaths or injuries reported for the May 30th event.

On October 4, 1998, three to five inches of rain fell in a three hour period between 6:00 PM and 9:00 PM CDT. Numerous road closures were reported throughout the county including several sections of I-35 and I-435. Leavenworth County Emergency Management reported road closures along most major roadways throughout the county. In Tonganoxie, three home rescues were reported due to flooding. There were no

reported property or crop damage or deaths or injuries in association with the October 4th event.

On October 2, 2005, torrential rains of from seven to nine inches caused record flooding of Stranger Creek in Easton, and near record flooding at Tonganoxie. Stranger Creek near Tonganoxie crested at 29.36 feet, or 6.36 feet above flood stage. 10,000 acres of crops had 60 percent or greater loss of crops. Several bridges and roads were washed out, totaling $2,800,000 in property damage and $300,000 in crop damage, with no deaths or injuries reported for this event.

Location and Extents

Due to the nature of flood this hazard will be evaluated on a jurisdictional basis.

In Kansas, floods usually occur during the season of highest precipitations or during heavy rainfalls after long dry spells. The area of Leavenworth County that has the most risk of flooding is along the Kansas and Missouri Rivers and their tributaries. Local climatic conditions in tandem with relatively limited usage of groundwater aquifers contribute to the presence of surface water and continuous streamflow in Leavenworth County. Abundant annual rainfall (relative to other Kansas counties), two major rivers forming the northeastern and southern borders, an extensive drainage basin spanning the entire county from north to south, and the presence of continuous hills and valleys as the dominating topographic feature throughout the county create an environment conducive to flash flooding. This observation is further substantiated by numerous flood warning signs posted in low areas across the county.

Numerous other creeks and tributaries criss-cross the county. Maps that display the location and extent of flood hazard areas are provided in Section 4.5.2 - Vulnerability Maps.

Probability of Future Occurrences

The likelihood of future events is estimated to remain the same as currently calculated. Leavenworth County can expect six flooding events a year (6.73 chance/year), with average property and crop damages of $250,379 per year.

# Wildfire - Leavenworth (UnInc.)

## Hazard Profile

A wildfire is an undesirable, uncontrolled burning of grasslands, brush or woodlands. According to the National Weather Service, more than 100,000 wildfires occur in the United States each year. About 90% of these wildfires are started by humans (i.e., campfires, debris burning, smoking, etc.); the other 10% are started by lightning.

The potential for wildfire depends upon surface fuel characteristics, weather conditions, recent climate conditions, topography, and fire behavior. Fuels are anything that can and will burn, and are the combustible materials that sustain a wildfire. Typically, this is the most prevalent vegetation in a given area. Weather is one of the most significant factors in determining the severity of wildfires. The intensity of fires and the rate with which they spread is directly related to the wind speed, temperature and relative humidity. Climatic conditions such as long-term drought also play a major role in the number and intensity of wildfires, and topography is important because the slope and shape of the terrain can change the rate of speed at which fire travels.

There are four major types of wildfires. Ground fires burn in natural litter, duff, roots or sometimes high organic soils. Once started they are very difficult to control, and some ground fires may even rekindle after being extinguished. Surface fires burn in grasses and low shrubs (up to 4’ tall) or in the lower branches of trees. They have the potential to spread rapidly, and the ease of their control depends upon the fuel involved. Crown fires burn in the tops of trees, and the ease of their control depends greatly upon wind conditions. Spotting fires occur when burning embers are thrown ahead of the main fire, and can be produced by crown fires as well as wind and topographic conditions. Once spotting begins, the fire will be very difficult to control.

## History and Jurisdiction Impacts

The NCDC database collects wildfire data for federally-owned land, but does not track private property; consequently, the Kansas Fire Marshal’s office tracks fire data for private property owners in Kansas. Collection of data began in 1997. Current information is provided in summary form only and reflects reported fires on an annual basis by county. At this time, specific incident loss data in the county is estimated based on reported information.

## Location and Extents

Wildfire in the State of Kansas is better defined as rangeland fire. This type of fire generally originates as a surface fire and can spread quickly across large areas. When wildfire does occur in Leavenworth County, it is rare that a home or business is lost, with most damage is limited to field crops. Wildfires are most common in the spring when brush is still brown and dry, and when fields have reached maturity in the fall months.

## Probability of Future Occurrences

The probability of Wildfire in Leavenworth County is relatively high, and the likelihood of future events is estimated to remain the same as currently calculated. Leavenworth County can expect an average of 11.02 wildfires a year that damage or destroy an average of 292.83 acres annually. The average annual damage to crops is estimated at $2,696.00.

Although one can extract data and probability of occurrence from historical data, the risk of Wildfire occurring and the location of damage appear to be random.

## Dam / Levee - Leavenworth (UnInc.)

This discussion includes the dam and levee structures identified in the county and the participating jurisdictions. Vulnerability for each pertinent jurisdiction is discussed in the next section.

Hazard Profile

DAM

A dam failure is defined as an uncontrolled release of the reservoir. The causes of dam failures can be divided into three groups: dam overtopping, excessive seepage, and structural failure of a component. Despite efforts to provide sufficient structural integrity and to perform inspection and maintenance, problems can develop that can lead to failure. While most dams have storage volumes small enough that failures have little or no repercussions, dams with large storage amounts can cause significant flooding downstream. Dam planning is a state-mandated hazard for inclusion in this plan.

Dam failures can result from any one or a combination of the following causes:

1. Prolonged periods of rainfall and flooding, which cause most failures;

2. Inadequate spillway capacity, resulting in excess overtopping flows;

3. Internal erosion caused by embankment or foundation leakage or piping;

4. Improper maintenance, including failure to remove trees, repair internal seepage problems, replace lost material from the cross section of the dam and abutments, or maintain gates, valves, and other operational components;

5. Improper design, including the use of improper construction materials and construction practices;

6. Negligent operation, including the failure to remove or open gates or valves during high flow periods;

7. Failure of upstream dams on the same waterway;

8. Landslides into reservoirs, which cause surges that result in overtopping;

9. High winds, which can cause significant wave action and result in substantial erosion; and

10. Earthquakes, which typically cause longitudinal cracks at the tops of the embankments, which can weaken entire structures.

LEVEE

A levee is a man-made structure; usually earthen embankments designed and constructed in accordance with sound engineering practices to contain, control, or divert the flow of water so as to provide protection from temporary flooding.

A levee is generally built parallel to a body of water (most often a river) in order to protect lives and property behind it from some level of flooding (100-year; 300-year; 500-year flood). Some reasons a levee may fail include:

1. A flood that exceeds the specific flood level for which the levee was designed may “overtop” (water can go over the top of the levee);

2. Failure to perform required maintenance, the need for which increases with age;

3. Lack of advance planning, resources and timely action to make the levee system ready for a flood event;

4.Soil failure, erosion, and intrusion of animals.

History and Jurisdiction Impacts

DAM

The Dam Safety Program is part of the broader Water Structures Program of the Kansas Department of Agriculture, Division of Water Resources. The Kansas Stream Obstructions Act (K.S.A. 82a-301 through 305a) gives the Chief Engineer, Kansas Department of Agriculture – Division of Water Resources the exclusive authority to regulate the construction, operation and maintenance of dams in Kansas. The written consent or permit of the Chief Engineer is required to construct a dam or make changes in any dam which meets the regulatory criteria.

NOTE: The State does not regulate Federal Reservoirs. In the State of Kansas, Federal Reservoirs are inspected, maintained and managed by either the U.S. Corps of Engineers or the Bureau of Reclamation. Emergency Action Plans (EAP) for these reservoirs, although classified, should be available for local governments upon request. The EAP should include inundation maps in the event of a flooding event, or an emergency at the facility.

The Chief Engineer has the power and duty to inspect any State-regulated dam. The Chief Engineer may issue orders requiring correction of deficiencies or removal of the dam. An annual inspection of all dams found to be unsafe is required until the deficiency is corrected or the dam is removed.

Where a dam condition is so dangerous as to pose an immediate safety threat, the Chief Engineer shall immediately employ any remedial means considered necessary. The Chief Engineer shall continue in full charge and control of any such dam until it is considered safe or the emergency prompting the remedial action has ceased.

Three dam hazard classifications have been established as described in K.A.R. 5-40-9. These classes are:

1. Class A (low hazard) – dams located in rural or agricultural areas where failure may damage farm buildings, limited agricultural land, or county, township and private roads.

2. Class B (significant hazard) – dams located in predominately rural or agricultural areas where failure may endanger few lives, damage isolated homes, secondary highways or minor railroads or cause interruption of use or service of relatively important public utilities.

3. Class C (high hazard) – dams located in areas where failure may cause extensive loss of life, serious damage to homes, industrial and commercial facilities, important public utilities, main highways or railroads.

The referenced hazard classes are solely impact-based. It is important to note that a high hazard dam is not necessarily unsafe. An individual dam's hazard classification is based upon the potential consequences of dam failure and does not reflect the physical condition of the dam. Post-construction development in the area is evaluated for potential to flood due to failure of the dam (breach inundation zone), and may result in the dam's reclassification to a higher hazard class than was originally assigned (Reference: Kansas Water Plan, Small Dam Safety and Rehabilitation, Policy Section, approved by the Kansas Water Authority November 18, 2005).

The classifications do not use a calculation of "likelihood" since the inspections do not include an evaluation of "worthiness" or probability of failure. Also, there are no reported dam failures in Leavenworth County, which precludes the calculation of an overall county likelihood. Since likelihood data is not available for potential dam failure, the county has elected to rely on the State classifications to prioritize, and to plan for High Hazard Class C dams only for this study.

As a general rule, populations, property and environment residing downstream of dams are most susceptible to damage from dam failure. There has been no reports or past incidents regarding dam failure in Leavenworth County.

LEVEE

The State of Kansas has four statutes that regulate the design and construction of levees. The Statutes include: 12-635 Flood Protection; Eminent Domain; 14-434 Power to Regulate; 19-3301 Flood Control; Counties, and 24-816 Within 1st Class Cities. These statutes guide an owner or community through the process of developing levees within the county, and mandate requirements for reporting and maintenance of the levee(s).

FEMA is responsible for identifying flood risks in areas behind levees through flood analysis and flood hazard mapping projects, including updating the nation's hazard maps through an effort called Flood Map Modernization (Map Mod). In addition, FEMA also provides criteria to define which protect against the 1-percent-annual-chance flood. FEMA does not examine or analyze structures to determine their performance in a given flood event. The levee owner must provide documentation to show that a levee meets current design, operations, and maintenance criteria. FEMA will accredit levees based on a review of these criteria. Levee owners or communities have a responsibility to provide documentation that a levee meets the requirements of Title 44 of the Code of Federal Regulations, Section 65.10, as part of a study/mapping project. Procedure Memorandum 34 (PM 34) allows for the issuance of a deadline to the community for submitting the required documentation. (Source: FEMA)

FEMA – Region VII reported that their MAP Mod modernization program focuses on levees found on existing FEMA Flood Maps (FIRMS) prior to update. FEMA is initiating a process to notify owners, schedule meetings, and provide guidance to owners. The intent is to assist meeting Federal requirements and accredit identified levees.

As a general rule, populations, property and environment residing within adjacent land areas of levees are most susceptible to damage from failure or breach of levee systems. There has been no reports or past incidents regarding levee failure in Leavenworth County.

Classification and discussions regarding dams and levees was required by FEMA as part of this plan.

Location and Extents

DAM

In Leavenworth County there are 221 known dams included in the State of Kansas, Department of Agriculture, Division of Water Resources database. The State data includes public and private-owned dams, as well as Federal Reservoirs, if within the county boundary. The State of Kansas uses several criteria to classify dams, and is primarialy based on the volume of water impounded, and the density, type, and value of development downstream to determine the potential impact of dam failure.

The Department of Water Resources identified seven (7) high-hazard dams in Leavenworth County that could impact the county in the event of breach or dam failure. Maps are included in the Vulnerability section. These seven dams include:

Bing's Lake Dam (State ID #DLV-0026), owner: Falcon Lakes Homes Association Incorporated, constructed in 2001.

Lake Hope Dam (State ID #DLV-0224), owner: Falcon Lakes Homes Association Incorporated, constructed in 2001.

Runnebaum Dam (State ID #DLV-0115), owner: William R. Runnebaum, constructed in 1977.

Smith Lake Dam (State ID #DLV-0114), owner: the US Army, constructed in 1942.

Merritt Lake Dam (State ID #DLV-0113), owner: by the US Army, constructed in 1942.

Wagner Dam (State ID #DLV-0057), owner: Ronald Foster, constructed in 1969.

Leavenworth State Lake Dam (State ID #DLV-0124), owner: Kansas Dept. of Wildlife & Parks,

constructed in 1994.

Dam owners are required to develop and submit an Emergency Action Plan (EAP) for each of their dams that include inundation maps for emergency response.

The Department of Agriculture, Division of Water Resources is conducting a HMGP Project for three (3) of the High Hazard Dams in Leavenworth County:

Bing's Lake Dam (State ID #DLV-0026)

Lake Hope Dam (State ID #DLV-0224)

Leavenworth State Lake Dam (State ID #DLV-0124)

The project will provide necessary funds to contract for the development of dam breach inundation maps to assist local communities in mitigating future losses to life and property. Maps will also be used for determining dam classification, zoning down stream, and development of emergency action plans.

During the preparation of this Plan, there were no EAPs available for review through the Department of Agriculture - Division of Water Resources or through the Leavenworth County Emergency Management Office for any of the seven (7) High Hazard Dams identified.

An Action has been included to obtain this data for future updates to this Plan.

Dam classifications provided by the Department of Agriculture, Division of Water Resources are not an indicator of “worthiness”, but do present a legitimate risk to the county. Consequently, these dams are included in the county mitigation planning process.

Federal Reservoirs Inside and Outside of Leavenworth County

There were no Federal Reservoirs identified inside Leavenworth County that could have a negative impact on the county in the event of a breach, overtopping, or failure of the dam.

The Department of Water Resources identified four Federal Reservoirs outside Leavenworth County that could potentially have a negative impact on the county in the event of a breach, overtopping, or failure of the dam. The dams are identified as the Tuttle Creek Dam in Riley County (Big Blue River River); the Milford Lake Dam in Geary County (Republican River); the Perry Lake Dam in Douglas County (Delaware River); and the Clinton Lake Dam in Douglas County (Wakarusa River).

Leavenworth County communities located in the Kansas River Basin, including Fall Leaf, Linwood, and Coldspur could potentially be impacted by floodwaters from Tuttle Creek Reservoir, located approximately six miles north of the city of Manhattan, Kansas. The Corp of Engineers has identified a “hot spot” along the middle part of the Humboldt Fault with a potential for generating an earthquake with a maximum magnitude (moment magnitude) of 6.6, at a minimum epicentral distance of 12.5 miles from the dam site. A potential breach in the dam from a large magnitude seismic event would flood residential, commercial, and agricultural areas downstream, and would have many other adverse social and economic consequences. The estimated warning time for Leavenworth County residents is approximately 33 hours.

Leavenworth County communities located in the Kansas River Basin, including Fall Leaf, Linwood, and Coldspur could also be impacted by floodwaters from Clinton Lake in the event of a catastrophic event. The Clinton Dam Contingency Plan (now called the Emergency Action Plan for Clinton Dam) is reportedly on file with the Leavenworth County LEOP. The Emergency Action Plan was last updated July 2002 by the Army Corps of Engineers. The hazard analysis provides an overview of emergency procedures, resources, communication procedures, etc.

Similar information, planning, emergency procedures, maps, etc. are provided for Milford Lake, which is located approximately five miles northwest of Junction City, Kansas. Review of the Emergency Action Plan indicates floodwaters from Milford Lake would reach Leavenworth County in approximately 35

hours, potentially impacting the communities of Fall Leaf, Linwood, and Coldspur.

An Emergency Action Plan for Perry Lake was not available for review, although it is estimated that flooding from the Perry Dam would impact Leavenworth County areas downstream along the Kansas River basin including the communities of Fall Leaf, Linwood, and Coldspur.

It was reported that the inundation maps for these Federal Reservoirs are classified under the Patriot Act and were not available for review or inclusion in this report. The Emergency Management department should have access to these plans in the event of an emergency.

LEVEE

In Leavenworth County there are 48 individual levee records included in the State of Kansas, Department of Agriculture, Division of Water Resources database. Leavenworth County was identified as the owner of four (4) of the levees, and one levee was identified as being owned by an individual. The remaining levees were listed as "Unknown". The following is a listing of the levees recorded by the Department of Agriculture, Division of Water Resources:

LLV-001, LLV-003, LLV-004, LLV-005, LLV-006, LLV-007, LLV-008, LLV-009, LLV-0010, LLV-0011, LLV-0012, LLV-0013, LLV-0014, LLV-0015, LLV-0016, LLV-0016L, LLV-0017, LLV-0018, LLV-0019, LLV-0020, LLV-0021, LLV-0022, LLV-0024, LLV-0025, LLV-0026, LLV-0028, LLV-0029, LLV-0030, LLV-0031, LLV-0032, LLV-0034, LLV-0035, LLV-0038, LLV-0039, LLV-0043, LLV-0044, LLV-0045-S, LLV-0046, LLV-0050, LLV-0051, LLV-0054, LLV-0057, LLV-0058, LLV-0059C, LLV-0060, LLV-0063, LLV-0067, LLV-0070, LLV-0089.

Department of Agriculture, Division of Water Resources-identified levees are not geo-located, but rather are located by Section, Township, and Range only. Levees were placed into a GIS produced county background to view general locations. The majority of levees were not found to be within, or close proximity to, any of the jurisdictions. Generally, the levees would be labeled as agricultural levees or levees located along the Missouri River, and don't appear to be providing protection from 100-year flood events. These levees were not identified on existing FEMA FIRM maps, nor were they identified by the MPC as county levees subject to PM 43.

Of the four levee systems identified as belonging to Leavenworth County, the Leavenworth County Emergency Management Coordinator reported that he was unaware of any county-owned levees, although he identified one levee system in the extreme southeast corner of unincorporated Leavenworth County that the county had sold to Douglas County. This levee system was identified on the August 2009 Digital Flood Insurance Rate Map (DFIRM) as the "Lawrence Unit".

The City of Lansing identified a US Army Corps of Engineers-owned levee system located along the northeastern edge of the Lansing city limits. This levee system was the only additional levee system identified on the August 2009 DFIRM.

An Action has been included in this Plan to obtain the necessary data for these and the other levee systems in the county for inclusion in future updates.

Probability of Future Occurrences

For reasons previously mentioned and uncontrollable by humans, it is highly possible a dam or levee can fail at any time given the right circumstances. However, the probability of future occurrence is reduced due to proactive preventative action on the part of KDA-DWR and the overall number of sources in Leavenworth County. As previously discussed in this section, KDA-DWR provides oversight to dam/levee repairs, oversees and issues construction permits, enforces safety standards and mandates, conducts periodic inspections, and provides public information to levee owners, engineers, and the general public. This proactive approach to managing dam safety in Kansas reduces the number of losses to property and life as a result of dam failure or near failure.

Although we can estimate probability of occurence from historical information, the risk of dam failure occurring and the location of damage appear to be a random event with a low risk probability.

# Flood - Basehor

Hazard Profile

Flooding is the most frequent and costly natural hazard in the United States. Floods are generally the result of excessive precipitation, and can be classified under two categories: flash floods, the product of heavy localized precipitation in a short time period over a given location; and general floods, caused by precipitation over a longer time period and over a given river basin. The severity of a flooding event is determined by a combination of stream and river basin topography and physiography, precipitation and weather patterns, recent soil moisture conditions and the degree of vegetative clearing.

Flash flooding events usually occur within minutes or hours of heavy amounts of rainfall, from a dam or levee failure, or from a sudden release of water held by an ice jam. Most flash flooding is caused by slow-moving thunderstorms in a local area or by heavy rains associated with hurricanes and tropical storms. Although flash flooding occurs often along mountain streams, it is also common in urbanized areas where much of the ground is covered by impervious surfaces.

General floods are usually longer-term events and may last for several days. The primary types of general flooding include riverine flooding, coastal flooding, and urban flooding. Riverine flooding is a function of excessive precipitation levels and water runoff volumes within the watershed of a stream or river. Coastal flooding is typically a result of storm surge, wind-driven waves, and heavy rainfall produced by hurricanes, tropical storms, nor’easters and other large coastal storms. Urban flooding occurs where man-made development has obstructed the natural flow of water and/or decreased the ability of natural groundcover to absorb and retain surface water runoff.

Periodic flooding of lands adjacent to rivers, streams and shorelines is a natural and inevitable occurrence that can be expected to take place based upon established recurrence intervals. The recurrence interval of a flood is defined as the average time interval, in years, expected between a flood event of a particular magnitude and an equal or larger flood. Flood magnitude increases with increasing recurrence interval.

A "floodplain" is the lowland area adjacent to a river, lake or ocean. Floodplains are designated by the frequency of the flood that is large enough to cover them. For example, the 10-year floodplain will likely be covered once every 10-years, and the 100-year floodplain covered once every 100-years.

Flood frequencies, such as the "100-year flood," are determined by plotting a graph of the size of all known floods for an area and determining how often floods of a particular size occur. Another way of expressing the flood frequency is the chance of occurrence in a given year, which is the percentage of the probability of flooding each year. For example, the 100-year flood has a 1% chance of occurring in any given year.

History and Jurisdiction Impacts

According to the National Climatic Data Center, there were a total of 101 reported flood events in Leavenworth County during the period of 1993 to 2008. Three events are described as follows:

On May 30, 1995, floods were caused by abnormally heavy rainfall through the month. Most farmers did not even get into the fields to plant, and those who did saw their early crops flooded out. Several roads were damaged by the high water across the region with costs at about $150,000. Damage to recreational areas and state facilities was estimated at nearly $200,000. Total damage to agriculture, which includes crops already planted and delays to planting causing yield losses, was estimated at around $500,000. There were no deaths or injuries reported for the May 30th event.

On October 4, 1998, three to five inches of rain fell in a three hour period between 6:00 PM and 9:00 PM CDT. Numerous road closures were reported throughout the county including several sections of I-35 and I-435. Leavenworth County Emergency Management reported road closures along most major roadways throughout the county. In Tonganoxie, three home rescues were reported due to flooding. There were no

reported property or crop damage or deaths or injuries in association with the October 4th event.

On October 2, 2005, torrential rains of from seven to nine inches caused record flooding of Stranger Creek in Easton, and near record flooding at Tonganoxie. Stranger Creek near Tonganoxie crested at 29.36 feet, or 6.36 feet above flood stage. 10,000 acres of crops had 60 percent or greater loss of crops. Several bridges and roads were washed out, totaling $2,800,000 in property damage and $300,000 in crop damage, with no deaths or injuries reported for this event.

Location and Extents

Due to the nature of flood this hazard will be evaluated on a jurisdictional basis.

A review of the Digital Flood Insurance Rate Map (DFIRM), dated August 18, 2009, reveals that portions of both Hog Creek and Wolf Creek are located within the city limits of Basehor. Special Flood Hazard Areas (SFHAs) are located along and in close proximity to both creeks, and encompass agricultural and developed areas. Maps that display the location and extent of flood hazard areas are provided in Section 4.5.2 - Vulnerability Maps.

Probability of Future Occurrences

Based on current criteria, the City of Basehor can expect six flooding events a year (6.73 chance/year).

# Flood - Easton

Hazard Profile

Flooding is the most frequent and costly natural hazard in the United States. Floods are generally the result of excessive precipitation, and can be classified under two categories: flash floods, the product of heavy localized precipitation in a short time period over a given location; and general floods, caused by precipitation over a longer time period and over a given river basin. The severity of a flooding event is determined by a combination of stream and river basin topography and physiography, precipitation and weather patterns, recent soil moisture conditions and the degree of vegetative clearing.

Flash flooding events usually occur within minutes or hours of heavy amounts of rainfall, from a dam or levee failure, or from a sudden release of water held by an ice jam. Most flash flooding is caused by slow-moving thunderstorms in a local area or by heavy rains associated with hurricanes and tropical storms. Although flash flooding occurs often along mountain streams, it is also common in urbanized areas where much of the ground is covered by impervious surfaces.

General floods are usually longer-term events and may last for several days. The primary types of general flooding include riverine flooding, coastal flooding, and urban flooding. Riverine flooding is a function of excessive precipitation levels and water runoff volumes within the watershed of a stream or river. Coastal flooding is typically a result of storm surge, wind-driven waves, and heavy rainfall produced by hurricanes, tropical storms, nor’easters and other large coastal storms. Urban flooding occurs where man-made development has obstructed the natural flow of water and/or decreased the ability of natural groundcover to absorb and retain surface water runoff.

Periodic flooding of lands adjacent to rivers, streams and shorelines is a natural and inevitable occurrence that can be expected to take place based upon established recurrence intervals. The recurrence interval of a flood is defined as the average time interval, in years, expected between a flood event of a particular magnitude and an equal or larger flood. Flood magnitude increases with increasing recurrence interval.

A "floodplain" is the lowland area adjacent to a river, lake or ocean. Floodplains are designated by the frequency of the flood that is large enough to cover them. For example, the 10-year floodplain will likely be covered once every 10-years, and the 100-year floodplain covered once every 100-years.

Flood frequencies, such as the "100-year flood," are determined by plotting a graph of the size of all known floods for an area and determining how often floods of a particular size occur. Another way of expressing the flood frequency is the chance of occurrence in a given year, which is the percentage of the probability of flooding each year. For example, the 100-year flood has a 1% chance of occurring in any given year.

History and Jurisdiction Impacts

According to the National Climatic Data Center, there were a total of 101 reported flood events in Leavenworth County during the period of 1993 to 2008. Three events are described as follows:

On May 30, 1995, floods were caused by abnormally heavy rainfall through the month. Most farmers did not even get into the fields to plant, and those who did saw their early crops flooded out. Several roads were damaged by the high water across the region with costs at about $150,000. Damage to recreational areas and state facilities was estimated at nearly $200,000. Total damage to agriculture, which includes crops already planted and delays to planting causing yeild losses was estimated at around $500,000. There was no deaths or injuries associated with the May 30th event.

On October 4, 1998, up to 3 to 5 inches of rain fell in a three hour period between 6:00 PM and 9:00 PM CDT. Numerous road closures were reported throughout the county including several sections of I-35 and I-435. Leavenworth County Emergency Management reported road closures along most major roadways throughout the county. In Tonganoxie, 3 home rescues were reported due to flooding. There was zero

reported property or crop damage and no deaths or injuries in association with the October 4th event in Leavenworth County.

On October 2, 2005, torrential rains of from seven to nine inches caused record flooding of Stranger Creek in Easton, and near record flooding at Tonganoxie. Stranger Creek near Tonganoxie crested at 29.36 feet, or 6.36 feet above flood stage. 10,000 acres of crops had 60 percent or greater loss of crops. Several bridges and roads were washed out, totaling $2,800,000 in property damage and $300,000 in crop damage, but no deaths or injuries.

Location and Extents

A review of the Digital Flood Insurance Rate Map (DFIRM), dated August 18, 2009, reveals that approximately half of the City of Easton is located within Special Flood Hazard Areas (SFHAs), due to the presence of Stranger Creek to the east and Dawson Creek to the west. The SFHAs encompass both agricultural and developed areas. Maps that display the location and extent of flood hazard areas are provided in Section 4.5.2 - Vulnerability Maps.

Probability of Future Occurrences

Based on current criteria, the City of Easton can expect six flooding events a year (6.73 chance/year).

# Flood - Lansing

Hazard Profile

Flooding is the most frequent and costly natural hazard in the United States. Floods are generally the result of excessive precipitation, and can be classified under two categories: flash floods, the product of heavy localized precipitation in a short time period over a given location; and general floods, caused by precipitation over a longer time period and over a given river basin. The severity of a flooding event is determined by a combination of stream and river basin topography and physiography, precipitation and weather patterns, recent soil moisture conditions and the degree of vegetative clearing.

Flash flooding events usually occur within minutes or hours of heavy amounts of rainfall, from a dam or levee failure, or from a sudden release of water held by an ice jam. Most flash flooding is caused by slow-moving thunderstorms in a local area or by heavy rains associated with hurricanes and tropical storms. Although flash flooding occurs often along mountain streams, it is also common in urbanized areas where much of the ground is covered by impervious surfaces.

General floods are usually longer-term events and may last for several days. The primary types of general flooding include riverine flooding, coastal flooding, and urban flooding. Riverine flooding is a function of excessive precipitation levels and water runoff volumes within the watershed of a stream or river. Coastal flooding is typically a result of storm surge, wind-driven waves, and heavy rainfall produced by hurricanes, tropical storms, nor’easters and other large coastal storms. Urban flooding occurs where man-made development has obstructed the natural flow of water and/or decreased the ability of natural groundcover to absorb and retain surface water runoff.

Periodic flooding of lands adjacent to rivers, streams and shorelines is a natural and inevitable occurrence that can be expected to take place based upon established recurrence intervals. The recurrence interval of a flood is defined as the average time interval, in years, expected between a flood event of a particular magnitude and an equal or larger flood. Flood magnitude increases with increasing recurrence interval.

A "floodplain" is the lowland area adjacent to a river, lake or ocean. Floodplains are designated by the frequency of the flood that is large enough to cover them. For example, the 10-year floodplain will likely be covered once every 10-years, and the 100-year floodplain covered once every 100-years.

Flood frequencies, such as the "100-year flood," are determined by plotting a graph of the size of all known floods for an area and determining how often floods of a particular size occur. Another way of expressing the flood frequency is the chance of occurrence in a given year, which is the percentage of the probability of flooding each year. For example, the 100-year flood has a 1% chance of occurring in any given year.

History and Jurisdiction Impacts

According to the National Climatic Data Center, there were a total of 101 reported flood events in Leavenworth County during the period of 1993 to 2008. Three events are described as follows:

On May 30, 1995, floods were caused by abnormally heavy rainfall through the month. Most farmers did not even get into the fields to plant, and those who did saw their early crops flooded out. Several roads were damaged by the high water across the region with costs at about $150,000. Damage to recreational areas and state facilities was estimated at nearly $200,000. Total damage to agriculture, which includes crops already planted and delays to planting causing yield losses, was estimated at around $500,000. There were no deaths or injuries reported for the May 30th event.

On October 4, 1998, three to five inches of rain fell in a three hour period between 6:00 PM and 9:00 PM CDT. Numerous road closures were reported throughout the county including several sections of I-35 and I-435. Leavenworth County Emergency Management reported road closures along most major roadways throughout the county. In Tonganoxie, three home rescues were reported due to flooding. There were no

reported property or crop damage or deaths or injuries in association with the October 4th event.

On October 2, 2005, torrential rains of from seven to nine inches caused record flooding of Stranger Creek in Easton, and near record flooding at Tonganoxie. Stranger Creek near Tonganoxie crested at 29.36 feet, or 6.36 feet above flood stage. 10,000 acres of crops had 60 percent or greater loss of crops. Several bridges and roads were washed out, totaling $2,800,000 in property damage and $300,000 in crop damage, with no deaths or injuries reported for this event.

Location and Extents

A review of the Digital Flood Insurance Rate Map (DFIRM), dated August 18, 2009, reveals that portions of both Seven Mile Creek and Nine Mile Creek are located within the city limits of Lansing. Special Flood Hazard Areas (SFHAs) are located along and in close proximity to both creeks, and encompass agricultural and developed areas. In addition, an apparent agricultural area on the eastern edge of Lansing is located in a SFHA. Maps that display the location and extent of flood hazard areas are provided in Section 4.5.2 - Vulnerability Maps.

Probability of Future Occurrences

Based on current criteria, the City of Lansing can expect six flooding events a year (6.73 chance/year).

## Dam / Levee - Lansing

Hazard Profile

DAM

See discussion at Leavenworth County (Unincorporated).

LEVEE

See discussion at Leavenworth County (Unincorporated).

History and Jurisdiction Impacts

DAM

See discussion at Leavenworth County (Unincorporated).

LEVEE

See discussion at Leavenworth County (Unincorporated).

Location and Extents

DAM

See discussion at Leavenworth County (Unincorporated).

None of the identified High Hazard Dams are located within the city limits of Lansing or were identified as a potential hazard to the community.

LEVEE

In Leavenworth County there are 48 individual levee records included in the State of Kansas, Department of Agriculture, Division of Water Resources database. See the Leavenworth County (Unincorporated) hazard profile for a listing of identified levees in Leavenworth County.

The City of Lansing identified a US Army Corps of Engineers-owned levee system located along the northeastern edge of the Lansing city limits. This levee system was the only levee system in the City of Lansing identified on the August 2009 DFIRM.

An Action has been included in this Plan to obtain the levee status data for this and the other levee systems in the county for inclusion in future updates.

Probability of Future Occurrences

There have been no reported dam or levee failures reported for the City of Lansing. Although we can estimate probability of occurence from historical information, the risk of dam failure occurring and the location of damage appear to be a random event with a low risk probability.

# Flood - Leavenworth

Hazard Profile

Flooding is the most frequent and costly natural hazard in the United States. Floods are generally the result of excessive precipitation, and can be classified under two categories: flash floods, the product of heavy localized precipitation in a short time period over a given location; and general floods, caused by precipitation over a longer time period and over a given river basin. The severity of a flooding event is determined by a combination of stream and river basin topography and physiography, precipitation and weather patterns, recent soil moisture conditions and the degree of vegetative clearing.

Flash flooding events usually occur within minutes or hours of heavy amounts of rainfall, from a dam or levee failure, or from a sudden release of water held by an ice jam. Most flash flooding is caused by slow-moving thunderstorms in a local area or by heavy rains associated with hurricanes and tropical storms. Although flash flooding occurs often along mountain streams, it is also common in urbanized areas where much of the ground is covered by impervious surfaces.

General floods are usually longer-term events and may last for several days. The primary types of general flooding include riverine flooding, coastal flooding, and urban flooding. Riverine flooding is a function of excessive precipitation levels and water runoff volumes within the watershed of a stream or river. Coastal flooding is typically a result of storm surge, wind-driven waves, and heavy rainfall produced by hurricanes, tropical storms, nor’easters and other large coastal storms. Urban flooding occurs where man-made development has obstructed the natural flow of water and/or decreased the ability of natural groundcover to absorb and retain surface water runoff.

Periodic flooding of lands adjacent to rivers, streams and shorelines is a natural and inevitable occurrence that can be expected to take place based upon established recurrence intervals. The recurrence interval of a flood is defined as the average time interval, in years, expected between a flood event of a particular magnitude and an equal or larger flood. Flood magnitude increases with increasing recurrence interval.

A "floodplain" is the lowland area adjacent to a river, lake or ocean. Floodplains are designated by the frequency of the flood that is large enough to cover them. For example, the 10-year floodplain will likely be covered once every 10-years, and the 100-year floodplain covered once every 100-years.

Flood frequencies, such as the "100-year flood," are determined by plotting a graph of the size of all known floods for an area and determining how often floods of a particular size occur. Another way of expressing the flood frequency is the chance of occurrence in a given year, which is the percentage of the probability of flooding each year. For example, the 100-year flood has a 1% chance of occurring in any given year.

History and Jurisdiction Impacts

According to the National Climatic Data Center, there were a total of 101 reported flood events in Leavenworth County during the period of 1993 to 2008. Three events are described as follows:

On May 30, 1995, floods were caused by abnormally heavy rainfall through the month. Most farmers did not even get into the fields to plant, and those who did saw their early crops flooded out. Several roads were damaged by the high water across the region with costs at about $150,000. Damage to recreational areas and state facilities was estimated at nearly $200,000. Total damage to agriculture, which includes crops already planted and delays to planting causing yield losses, was estimated at around $500,000. There were no deaths or injuries reported for the May 30th event.

On October 4, 1998, three to five inches of rain fell in a three hour period between 6:00 PM and 9:00 PM CDT. Numerous road closures were reported throughout the county including several sections of I-35 and I-435. Leavenworth County Emergency Management reported road closures along most major roadways throughout the county. In Tonganoxie, three home rescues were reported due to flooding. There were no

reported property or crop damage or deaths or injuries in association with the October 4th event.

On October 2, 2005, torrential rains of from seven to nine inches caused record flooding of Stranger Creek in Easton, and near record flooding at Tonganoxie. Stranger Creek near Tonganoxie crested at 29.36 feet, or 6.36 feet above flood stage. 10,000 acres of crops had 60 percent or greater loss of crops. Several bridges and roads were washed out, totaling $2,800,000 in property damage and $300,000 in crop damage, with no deaths or injuries reported for this event.

The City of Leavenworth has identified 35 residential structures and 22 commercial structures that may be targeted for future acquisition activities. Of these identified structures, one (1) residential structure and one (1) commercial structure appear on the Repetitive Loss Properties list for the City of Leavenworth and are reported to have flood insurance; the remaining structures targeted for possible acquisition activities by the City of Leavenworth do not appear to have flood insurance and do not appear on the Repetitive Loss Properties list for the City of Leavenworth.

There were 22 repetitive loss properties identified in incorporated areas of Leavenworth County, three of which have been mitigated. One of the properties was located in the City of Leavenworth. Reportedly, the structures on the property has been demolished, with the area returned to green.

Location and Extents

A review of the Digital Flood Insurance Rate Map (DFIRM), dated August 18, 2009, reveals that portions of both Five Mile Creek and Three Mile Creek are located within the city limits of Leavenworth. Special Flood Hazard Areas (SFHAs) are located along and in close proximity to both creeks, and encompass agricultural and developed areas. In addition, an area along the eastern edge of Leavenworth is located in a SFHA, adjacent to the Missouri River. Maps that display the location and extent of flood hazard areas are provided in Section 4.5.2 - Vulnerability Maps.

Probability of Future Occurrences

Based on current criteria, the City of Leavenworth can expect six flooding events a year (6.73 chance/year).

# Flood - Linwood

Hazard Profile

Flooding is the most frequent and costly natural hazard in the United States. Floods are generally the result of excessive precipitation, and can be classified under two categories: flash floods, the product of heavy localized precipitation in a short time period over a given location; and general floods, caused by precipitation over a longer time period and over a given river basin. The severity of a flooding event is determined by a combination of stream and river basin topography and physiography, precipitation and weather patterns, recent soil moisture conditions and the degree of vegetative clearing.

Flash flooding events usually occur within minutes or hours of heavy amounts of rainfall, from a dam or levee failure, or from a sudden release of water held by an ice jam. Most flash flooding is caused by slow-moving thunderstorms in a local area or by heavy rains associated with hurricanes and tropical storms. Although flash flooding occurs often along mountain streams, it is also common in urbanized areas where much of the ground is covered by impervious surfaces.

General floods are usually longer-term events and may last for several days. The primary types of general flooding include riverine flooding, coastal flooding, and urban flooding. Riverine flooding is a function of excessive precipitation levels and water runoff volumes within the watershed of a stream or river. Coastal flooding is typically a result of storm surge, wind-driven waves, and heavy rainfall produced by hurricanes, tropical storms, nor’easters and other large coastal storms. Urban flooding occurs where man-made development has obstructed the natural flow of water and/or decreased the ability of natural groundcover to absorb and retain surface water runoff.

Periodic flooding of lands adjacent to rivers, streams and shorelines is a natural and inevitable occurrence that can be expected to take place based upon established recurrence intervals. The recurrence interval of a flood is defined as the average time interval, in years, expected between a flood event of a particular magnitude and an equal or larger flood. Flood magnitude increases with increasing recurrence interval.

A "floodplain" is the lowland area adjacent to a river, lake or ocean. Floodplains are designated by the frequency of the flood that is large enough to cover them. For example, the 10-year floodplain will likely be covered once every 10-years, and the 100-year floodplain covered once every 100-years.

Flood frequencies, such as the "100-year flood," are determined by plotting a graph of the size of all known floods for an area and determining how often floods of a particular size occur. Another way of expressing the flood frequency is the chance of occurrence in a given year, which is the percentage of the probability of flooding each year. For example, the 100-year flood has a 1% chance of occurring in any given year.

History and Jurisdiction Impacts

According to the National Climatic Data Center, there were a total of 101 reported flood events in Leavenworth County during the period of 1993 to 2008. Three events are described as follows:

On May 30, 1995, floods were caused by abnormally heavy rainfall through the month. Most farmers did not even get into the fields to plant, and those who did saw their early crops flooded out. Several roads were damaged by the high water across the region with costs at about $150,000. Damage to recreational areas and state facilities was estimated at nearly $200,000. Total damage to agriculture, which includes crops already planted and delays to planting causing yield losses, was estimated at around $500,000. There were no deaths or injuries reported for the May 30th event.

On October 4, 1998, three to five inches of rain fell in a three hour period between 6:00 PM and 9:00 PM CDT. Numerous road closures were reported throughout the county including several sections of I-35 and I-435. Leavenworth County Emergency Management reported road closures along most major roadways throughout the county. In Tonganoxie, three home rescues were reported due to flooding. There were no

reported property or crop damage or deaths or injuries in association with the October 4th event.

On October 2, 2005, torrential rains of from seven to nine inches caused record flooding of Stranger Creek in Easton, and near record flooding at Tonganoxie. Stranger Creek near Tonganoxie crested at 29.36 feet, or 6.36 feet above flood stage. 10,000 acres of crops had 60 percent or greater loss of crops. Several bridges and roads were washed out, totaling $2,800,000 in property damage and $300,000 in crop damage, with no deaths or injuries reported for this event.

Location and Extents

A review of the Digital Flood Insurance Rate Map (DFIRM), dated August 18, 2009, reveals that the City of Linwood is located in close proximity to the Kansas River, and portions of both Nine Mile Creek and Stranger Creek are located within the city limits of Linwood. Special Flood Hazard Areas (SFHAs) are located along and in close proximity to both creeks, encompassing agricultural and developed areas. In addition, SFHAs in association with the Kansas River are apparent along the southern portions of Linwood. Maps that display the location and extent of flood hazard areas are provided in Section 4.5.2 - Vulnerability Maps.

Probability of Future Occurrences

Based on current criteria, the City of Linwood can expect six flooding events a year (6.73 chance/year).

# Flood - Tonganoxie

Hazard Profile

Flooding is the most frequent and costly natural hazard in the United States. Floods are generally the result of excessive precipitation, and can be classified under two categories: flash floods, the product of heavy localized precipitation in a short time period over a given location; and general floods, caused by precipitation over a longer time period and over a given river basin. The severity of a flooding event is determined by a combination of stream and river basin topography and physiography, precipitation and weather patterns, recent soil moisture conditions and the degree of vegetative clearing.

Flash flooding events usually occur within minutes or hours of heavy amounts of rainfall, from a dam or levee failure, or from a sudden release of water held by an ice jam. Most flash flooding is caused by slow-moving thunderstorms in a local area or by heavy rains associated with hurricanes and tropical storms. Although flash flooding occurs often along mountain streams, it is also common in urbanized areas where much of the ground is covered by impervious surfaces.

General floods are usually longer-term events and may last for several days. The primary types of general flooding include riverine flooding, coastal flooding, and urban flooding. Riverine flooding is a function of excessive precipitation levels and water runoff volumes within the watershed of a stream or river. Coastal flooding is typically a result of storm surge, wind-driven waves, and heavy rainfall produced by hurricanes, tropical storms, nor’easters and other large coastal storms. Urban flooding occurs where man-made development has obstructed the natural flow of water and/or decreased the ability of natural groundcover to absorb and retain surface water runoff.

Periodic flooding of lands adjacent to rivers, streams and shorelines is a natural and inevitable occurrence that can be expected to take place based upon established recurrence intervals. The recurrence interval of a flood is defined as the average time interval, in years, expected between a flood event of a particular magnitude and an equal or larger flood. Flood magnitude increases with increasing recurrence interval.

A "floodplain" is the lowland area adjacent to a river, lake or ocean. Floodplains are designated by the frequency of the flood that is large enough to cover them. For example, the 10-year floodplain will likely be covered once every 10-years, and the 100-year floodplain covered once every 100-years.

Flood frequencies, such as the "100-year flood," are determined by plotting a graph of the size of all known floods for an area and determining how often floods of a particular size occur. Another way of expressing the flood frequency is the chance of occurrence in a given year, which is the percentage of the probability of flooding each year. For example, the 100-year flood has a 1% chance of occurring in any given year.

History and Jurisdiction Impacts

According to the National Climatic Data Center, there were a total of 101 reported flood events in Leavenworth County during the period of 1993 to 2008. Three events are described as follows:

On May 30, 1995, floods were caused by abnormally heavy rainfall through the month. Most farmers did not even get into the fields to plant, and those who did saw their early crops flooded out. Several roads were damaged by the high water across the region with costs at about $150,000. Damage to recreational areas and state facilities was estimated at nearly $200,000. Total damage to agriculture, which includes crops already planted and delays to planting causing yield losses, was estimated at around $500,000. There were no deaths or injuries reported for the May 30th event.

On October 4, 1998, three to five inches of rain fell in a three hour period between 6:00 PM and 9:00 PM CDT. Numerous road closures were reported throughout the county including several sections of I-35 and I-435. Leavenworth County Emergency Management reported road closures along most major roadways throughout the county. In Tonganoxie, three home rescues were reported due to flooding. There were no

reported property or crop damage or deaths or injuries in association with the October 4th event.

On October 2, 2005, torrential rains of from seven to nine inches caused record flooding of Stranger Creek in Easton, and near record flooding at Tonganoxie. Stranger Creek near Tonganoxie crested at 29.36 feet, or 6.36 feet above flood stage. 10,000 acres of crops had 60 percent or greater loss of crops. Several bridges and roads were washed out, totaling $2,800,000 in property damage and $300,000 in crop damage, with no deaths or injuries reported for this event.

Location and Extents

A review of the Digital Flood Insurance Rate Map (DFIRM), dated August 18, 2009, reveals that the Tonganoxie Creek flows northwest to southeast through the City of Tonganoxie. Special Flood Hazard Areas (SFHAs) are located along and in close proximity to the creek, encompassing both agricultural and developed areas. Maps that display the location and extent of flood hazard areas are provided in Section 4.5.2 - Vulnerability Maps.

Probability of Future Occurrences

Based on current criteria, the City of Tonganoxie can expect six flooding events a year (6.73 chance/year).

# Flood - USD 458

Hazard Profile

Flooding is the most frequent and costly natural hazard in the United States. Floods are generally the result of excessive precipitation, and can be classified under two categories: flash floods, the product of heavy localized precipitation in a short time period over a given location; and general floods, caused by precipitation over a longer time period and over a given river basin. The severity of a flooding event is determined by a combination of stream and river basin topography and physiography, precipitation and weather patterns, recent soil moisture conditions and the degree of vegetative clearing.

Flash flooding events usually occur within minutes or hours of heavy amounts of rainfall, from a dam or levee failure, or from a sudden release of water held by an ice jam. Most flash flooding is caused by slow-moving thunderstorms in a local area or by heavy rains associated with hurricanes and tropical storms. Although flash flooding occurs often along mountain streams, it is also common in urbanized areas where much of the ground is covered by impervious surfaces.

General floods are usually longer-term events and may last for several days. The primary types of general flooding include riverine flooding, coastal flooding, and urban flooding. Riverine flooding is a function of excessive precipitation levels and water runoff volumes within the watershed of a stream or river. Coastal flooding is typically a result of storm surge, wind-driven waves, and heavy rainfall produced by hurricanes, tropical storms, nor’easters and other large coastal storms. Urban flooding occurs where man-made development has obstructed the natural flow of water and/or decreased the ability of natural groundcover to absorb and retain surface water runoff.

Periodic flooding of lands adjacent to rivers, streams and shorelines is a natural and inevitable occurrence that can be expected to take place based upon established recurrence intervals. The recurrence interval of a flood is defined as the average time interval, in years, expected between a flood event of a particular magnitude and an equal or larger flood. Flood magnitude increases with increasing recurrence interval.

A "floodplain" is the lowland area adjacent to a river, lake or ocean. Floodplains are designated by the frequency of the flood that is large enough to cover them. For example, the 10-year floodplain will likely be covered once every 10-years, and the 100-year floodplain covered once every 100-years.

Flood frequencies, such as the "100-year flood," are determined by plotting a graph of the size of all known floods for an area and determining how often floods of a particular size occur. Another way of expressing the flood frequency is the chance of occurrence in a given year, which is the percentage of the probability of flooding each year. For example, the 100-year flood has a 1% chance of occurring in any given year.

History and Jurisdiction Impacts

According to the National Climatic Data Center, there were a total of 101 reported flood events in Leavenworth County during the period of 1993 to 2008. Three events are described as follows:

On May 30, 1995, floods were caused by abnormally heavy rainfall through the month. Most farmers did not even get into the fields to plant, and those who did saw their early crops flooded out. Several roads were damaged by the high water across the region with costs at about $150,000. Damage to recreational areas and state facilities was estimated at nearly $200,000. Total damage to agriculture, which includes crops already planted and delays to planting causing yeild losses was estimated at around $500,000. There was no deaths or injuries associated with the May 30th event.

On October 4, 1998, up to 3 to 5 inches of rain fell in a three hour period between 6:00 PM and 9:00 PM CDT. Numerous road closures were reported throughout the county including several sections of I-35 and I-435. Leavenworth County Emergency Management reported road closures along most major roadways throughout the county. In Tonganoxie, 3 home rescues were reported due to flooding. There was zero

reported property or crop damage and no deaths or injuries in association with the October 4th event in Leavenworth County.

On October 2, 2005, torrential rains of from seven to nine inches caused record flooding of Stranger Creek in Easton, and near record flooding at Tonganoxie. Stranger Creek near Tonganoxie crested at 29.36 feet, or 6.36 feet above flood stage. 10,000 acres of crops had 60 percent or greater loss of crops. Several bridges and roads were washed out, totaling $2,800,000 in property damage and $300,000 in crop damage, but no deaths or injuries.

Location and Extents

USD 458 currently has seven schools located in the cities of Basehor and Linwood.

A review of the City of Basehor Digital Flood Insurance Rate Map (DFIRM), dated August 18, 2009, reveals that portions of both Hog Creek and Wolf Creek are located within the city limits of Basehor. Special Flood Hazard Areas (SFHAs) are located along and in close proximity to both creeks, and encompass agricultural and developed areas. One of the USD 458 schools in Basehor is located approximately one-quarter mile from a SFHA.

A review of the City of Linwood DFIRM, dated August 18, 2009, reveals that the City of Linwood is located in close proximity to the Kansas River, and portions of both Nine Mile Creek and Stranger Creek are located within the city limits of Linwood. Special Flood Hazard Areas (SFHAs) are located along and in close proximity to both creeks, encompassing agricultural and developed areas. In addition, SFHAs in association with the Kansas River are apparent along the southern portions of Linwood. The USD 458 school in Linwood is located approximately one-quarter mile from a SFHA.

Maps that display the location and extent of flood hazard areas are provided in Section 4.5.2 - Vulnerability Maps.

Probability of Future Occurrences

Based on current criteria, the cities of Basehor and Linwood can expect six flooding events a year (6.73 chance/year).

## 4.5 Vulnerability Assessment

*Multihazard Requirement §201.6(c)(2)(ii): [The risk assessment shall include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community.*

The vulnerability assessment was completed predominantly through the use of objective hazard and risk analysis, along with the use of county-provided data and best available information at the time of the study. It describes the county's hazard prone locations and provides an inventory of repetitive loss properties (if applicable) and critical facilities. This portion of the plan also describes current development trends and implications for Leavenworth County, and includes maps that were generated specifically to illustrate jurisdiction vulnerability. Lastly, this section discusses what was learned through the process of determining the county's current and future vulnerability to natural hazards, and provides several conclusions on community vulnerability.

Natural Hazards

Situated in the central portion of the country, Leavenworth County is located in an area that is prone to the effects of sudden collision of cold/warm fronts creating winter storms (blizzard, ice, heavy snow, etc.), and thunderstorms (high wind, hail, tornadoes, heavy rain, lightning, etc.). Areas throughout the county are vulnerable to the natural hazards identified in Section 4.0, and for the most part, face a uniform level of risk for each hazard, with the exception of flood, wildfire, and dam/levee failure. This is due to the nature of the natural weather events that occur in the county. Hail, thunderstorm high winds, winter

storms, lightning, and tornadoes are unpredictable and random in nature. Since the majority of the county is rural, coupled with its sparse pattern of land development, it does not present areas that are significantly more vulnerable to property loss than others. The majority of people who live and work in Leavenworth County reside in the cities of Leavenworth, Lansing, Basehor, and Tonganoxie, but the probability that a jurisdiction would be affected more often than other areas in the county is considered statistically very low.

Based on historical data, and for purposes of this hazard mitigation plan, Leavenworth County will assess the above-referenced natural hazards vulnerability on a countywide planning basis. Flood, dam/levee and wildfire will be addressed as separate geographic planning areas.

### 4.5.1 Damage and Vulnerability Overview

*Multihazard Requirement §201.6(c)(2)(ii)(A): The plan should describe vulnerability in terms of the types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard area …*

*Multihazard Requirement §201.6(c)(2)(ii)(B): [The plan should describe vulnerability in terms of an] estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(i)(A) of this section and a description of the methodology used to prepare the estimate …*

The data to develop inventory estimates were obtained through various sources including the following:

- Leavenworth County Appraiser
- Kansas Department of Revenue, Division of Property Valuation
- Leavenworth County Mitigation Planning Committee
- Kansas Department of Transportation
- RS Means estimator tools
- Emergency Management Department
- Kansas Water Office

Where data failure occurred, subjective quantitative data was used to obtain estimated facility/infrastructure costs. The following tables attempt to assess the potential damage and vulnerability of Leavenworth County based on these estimates. Table 4.5.1 (1) was completed to assess the current and future vulnerability of Leavenworth County based upon the assessed value of assets within the jurisdiction. The inventory costs are based on the number and assessed valuation and do not reflect replacement value for other assets such as land, equipment, fixture, and furniture assets.

## TABLE 4.5.1 (1) ALL-HAZARDS COUNTY POTENTIAL DAMAGE INVENTORY

TABLE 4.5.1 (1) ALL-HAZARDS COUNTY POTENTIAL DAMAGE INVENTORY

| | Current Conditions | | Projection Yr: 2040 (CAGR: 1.03%) |
|---|---|---|---|
| Type of Development | Current Dollar Exposure | Number of Buildings | Future Replacement Value |
| Urban/Rural Real Property | | | |
| Residential | $3,472,999,304 | 27028 | $4,816,186,695 |
| Agricultural | $23,485,377 | 5075 | $32,568,380 |
| Vacant Lots | $98,932,033 | 0 | $137,194,137 |
| Not-For-Profit | $2,458,150 | 16 | $3,408,843 |
| Com/Industiral | $292,601,792 | 1800 | $405,765,949 |
| Ag Improvement | $18,286,088 | 0 | $25,358,258 |
| All Other | $342,053 | 17 | $474,342 |
| Total Real Property | $3,909,104,797 | | $5,420,956,604 |
| Urban/Rural Personal Property | | | |
| Res. Mobile Homes | $9,484,530 | 508 | $13,152,685 |
| Mineral Leasehold | $3,908,973 | 0 | $5,420,774 |
| Motor Vehicles | $9,901,443 | 0 | $13,730,840 |
| C/I Mach/Equipment | $71,747,960 | 0 | $99,496,585 |
| Boat/Marine/Trailer | $8,168,330 | 0 | $11,327,443 |
| Other | $4,975,003 | 0 | $6,899,092 |
| Total Personal Property | $108,186,239 | | $150,027,420 |
| Public Utility | | | |
| Urban - Public Utility | $48,680,724 | 0 | $67,508,063 |
| Rural - Public Utility | $62,817,955 | 0 | $87,112,888 |
| Total Public Utility | $111,498,679 | | $154,620,951 |
| Totals | | | |
| Totals | $4,128,789,715 | | $5,725,604,975 |

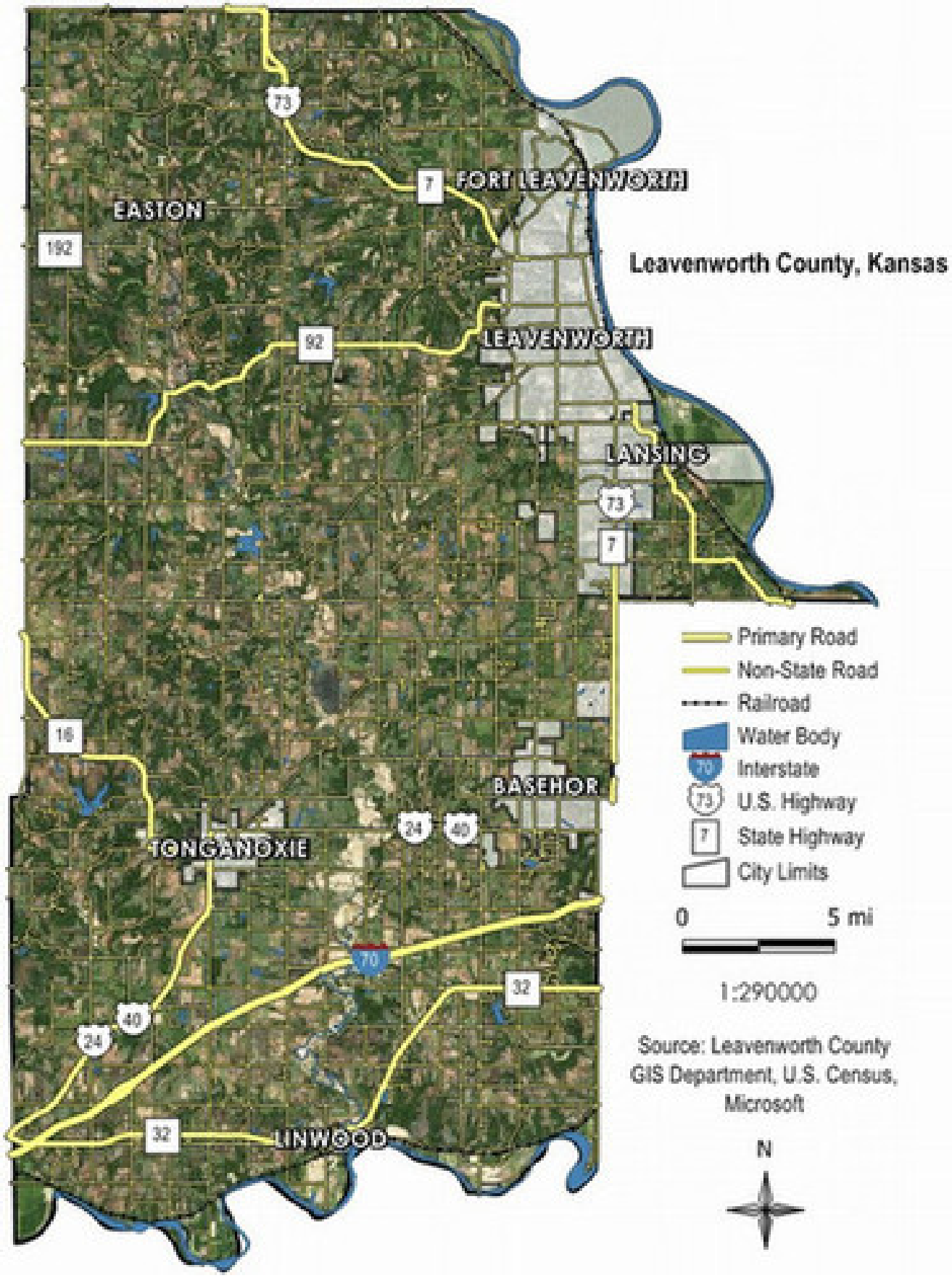
It is anticipated that when more data is obtained through development and cataloging of cadastral data, more accurate replacement cost data will be included in future updates to this Plan.

In addition to being used for general mitigation planning purposes, this vulnerability assessment can be used by Leavenworth County as documentation to support the need for mitigation projects that can be funded through the Federal Hazard Mitigation Grant Program (HMGP), the Pre-Disaster Mitigation Program (PDM) and/or similar grant programs. The information gathered for public buildings and critical facilities can also be used when applying for both Federal and State Public Assistance funds which provide assistance for the repair and mitigation of public facilities and infrastructure following declared disaster events.

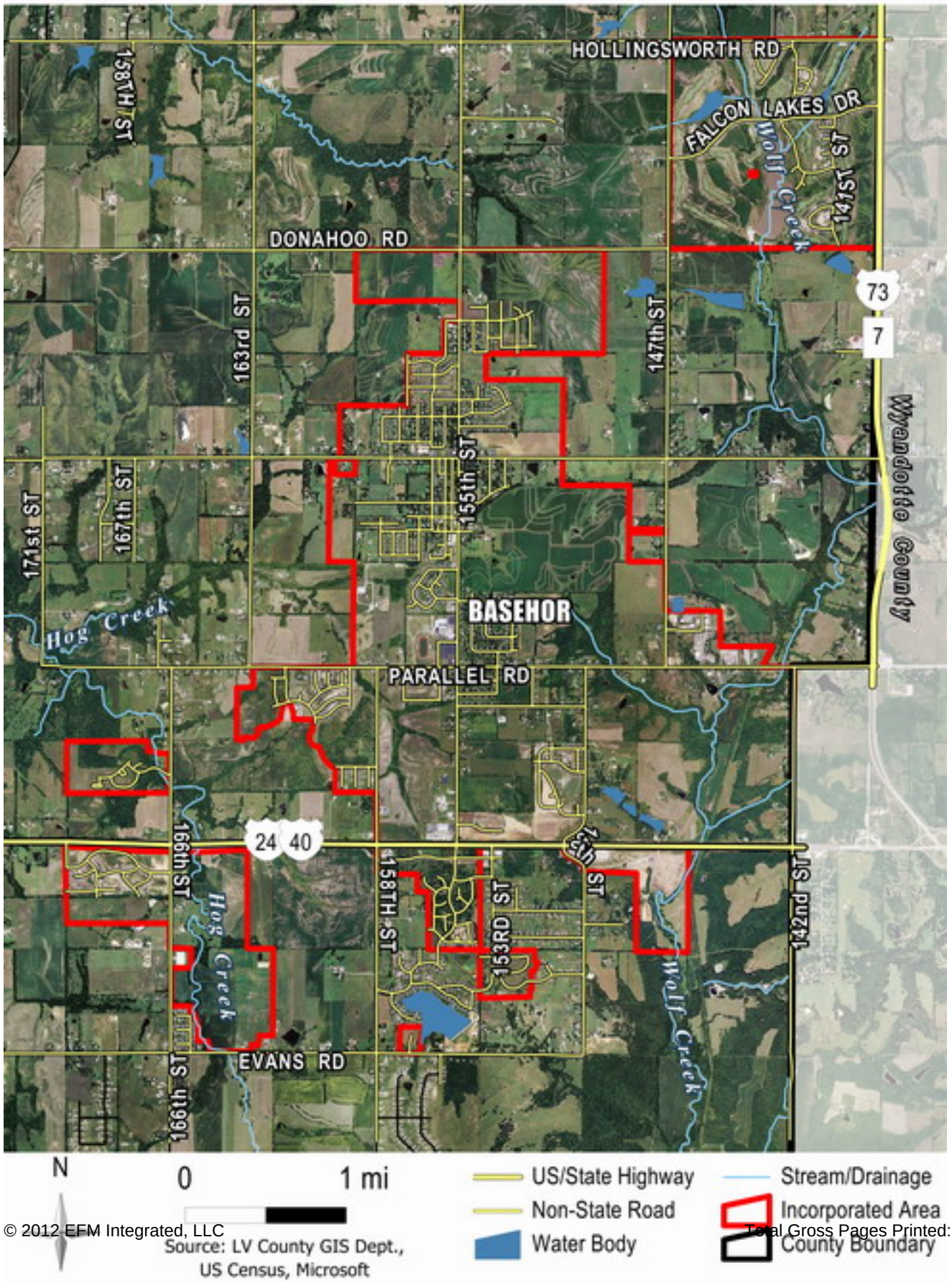
## 4.5.2 Vulnerability Maps

The following maps provide brief descriptions for the data layers used to assess hazard vulnerability for Leavenworth County. Digital data used for the production of these maps was acquired from the Kansas Geospatial Community Commons, U.S Census Tiger/Line, FEMA, and other resources.

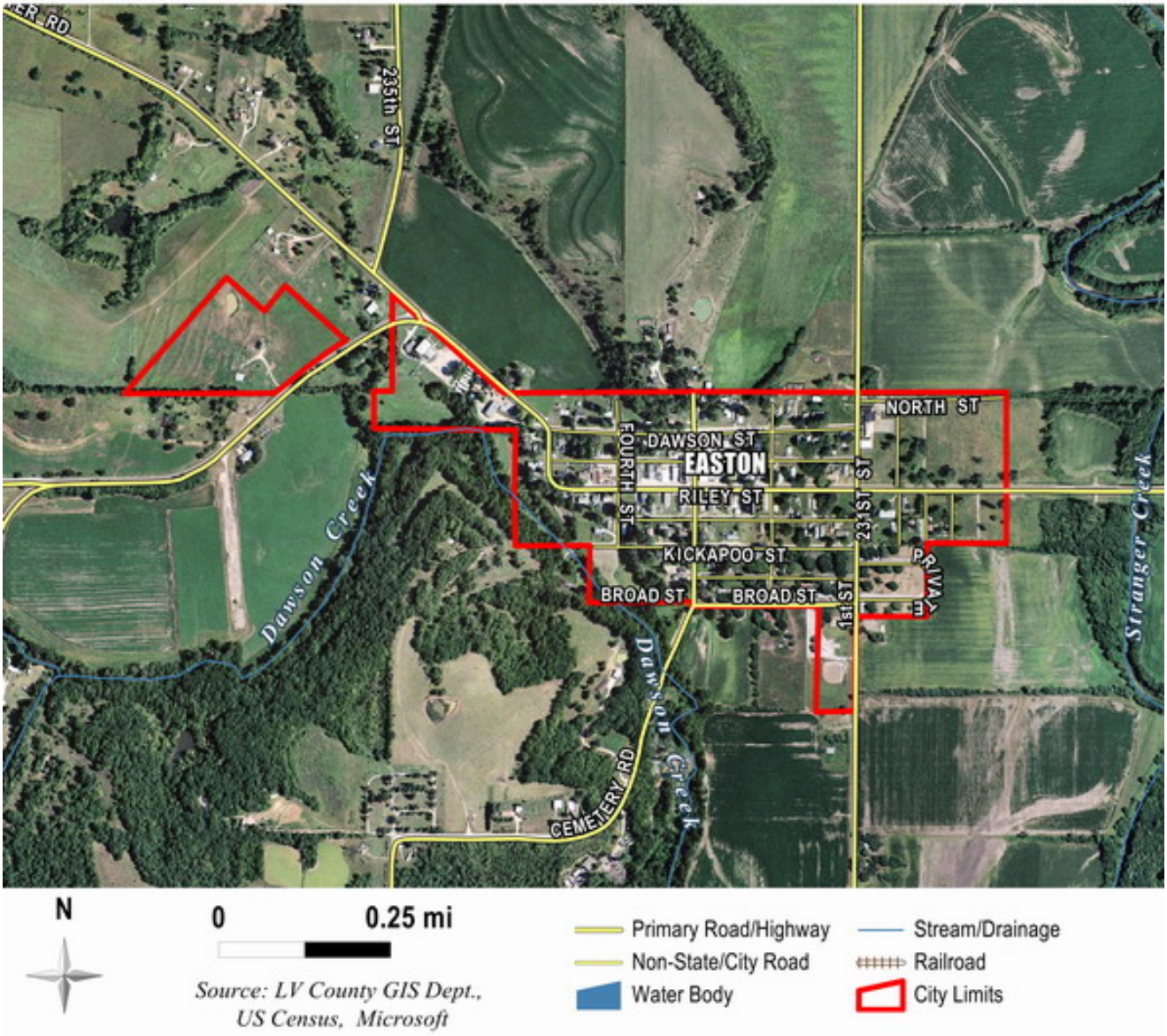
# 1. Leavenworth County Base Maps


Leavenworth County, Kansas
FORT LEAVENWORTH
EASTON
LEAVENWORTH
LANSING
BASEHOR
TONGANOXIE
LINWOOD
73
7
192
92
16
24
40
70
32
Primary Road
Non-State Road
Railroad
Water Body
Interstate
U.S. Highway
State Highway
City Limits
0
5 mi
1:290000
Source: Leavenworth County GIS Department, U.S. Census, Microsoft
N

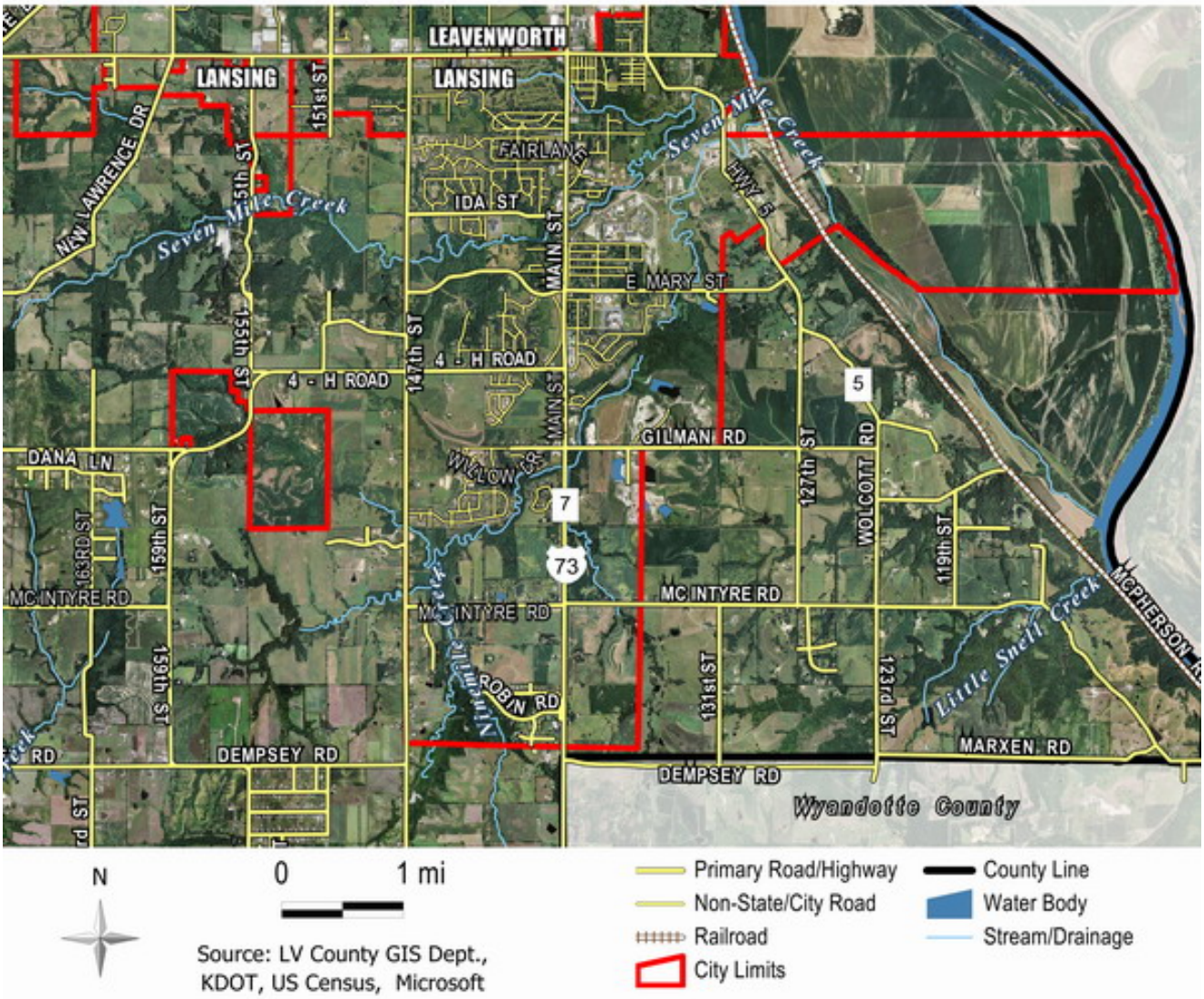
# Basehor, Kansas



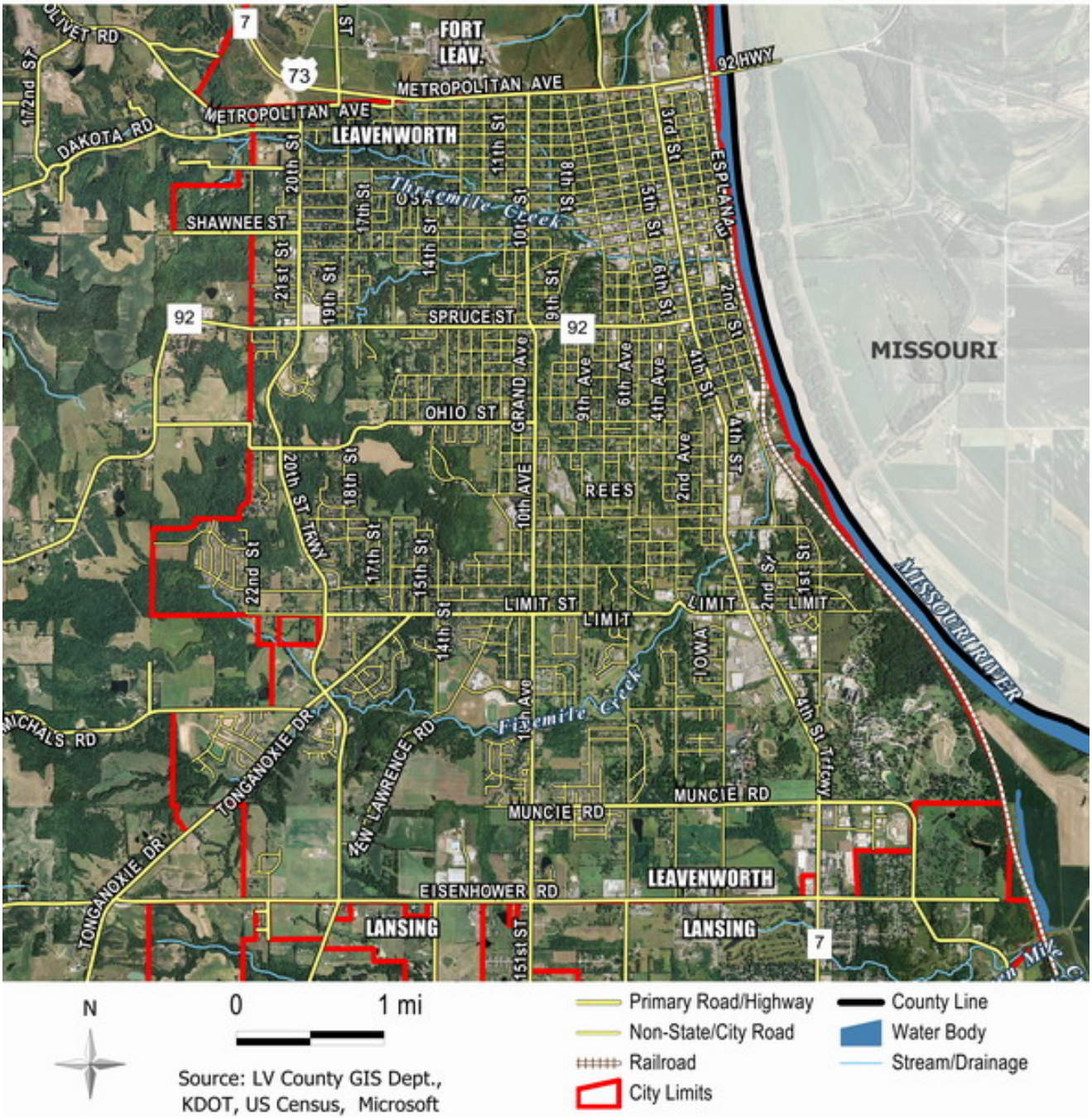
Easton, Kansas

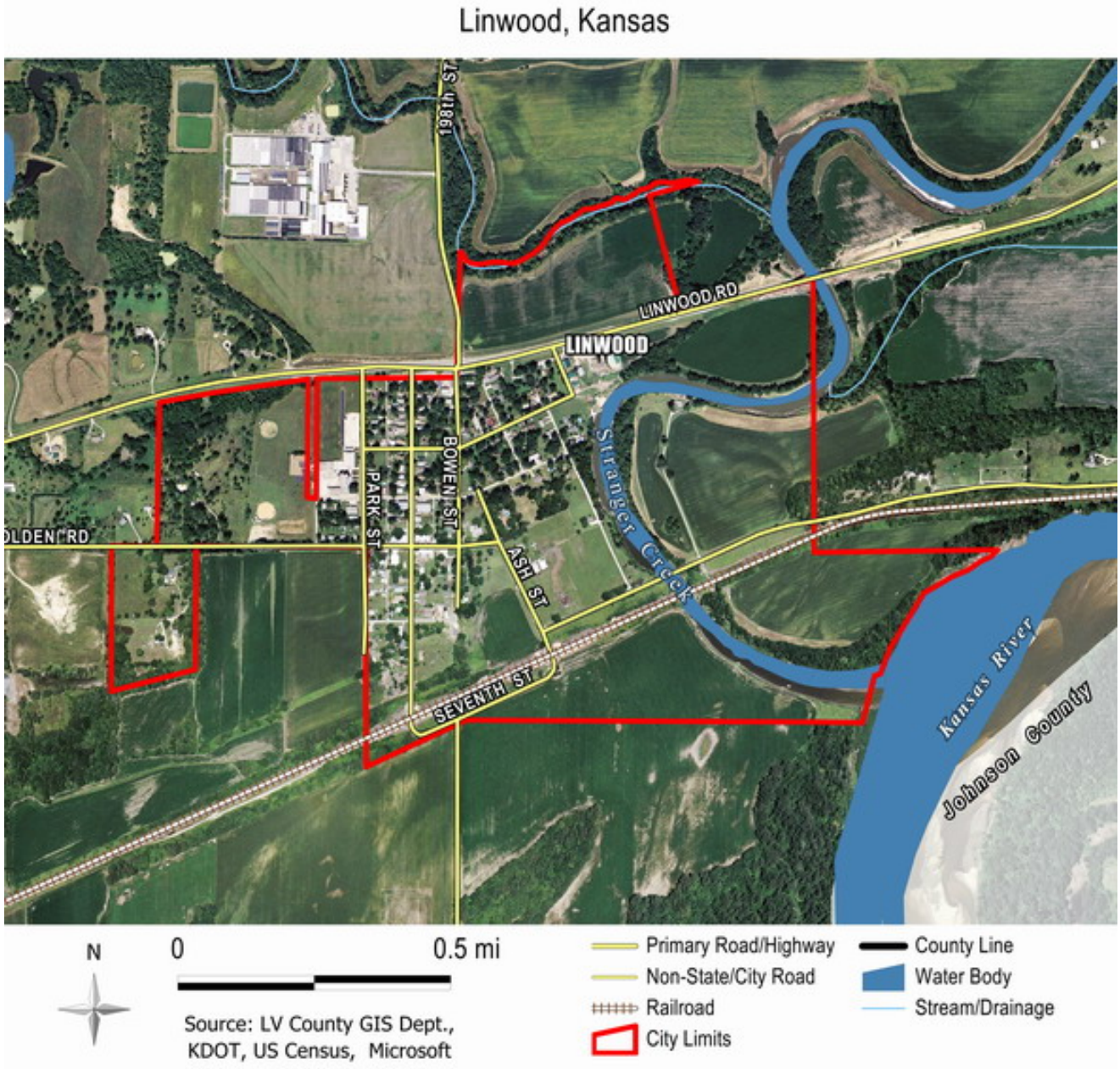


Lansing, Kansas

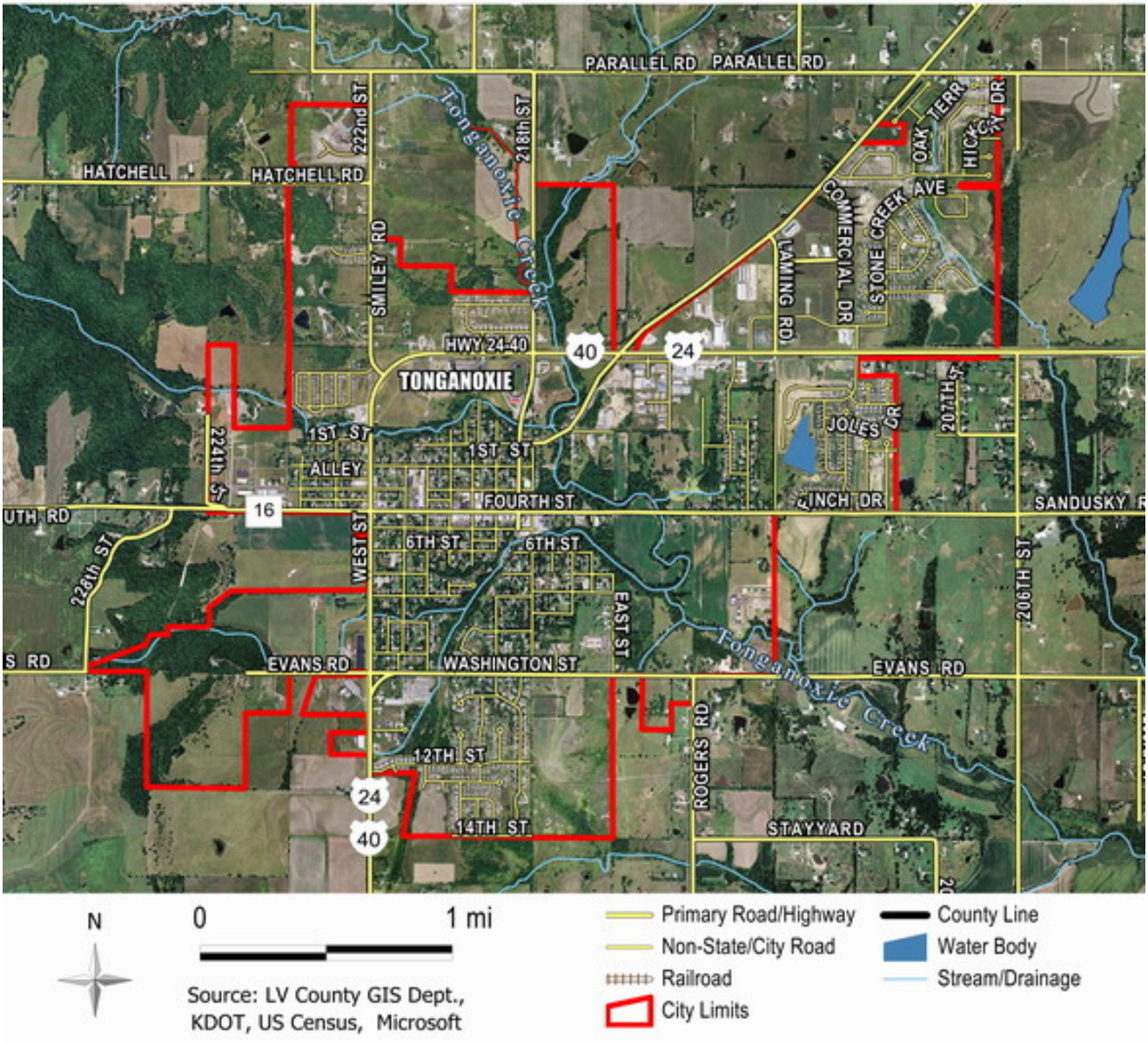


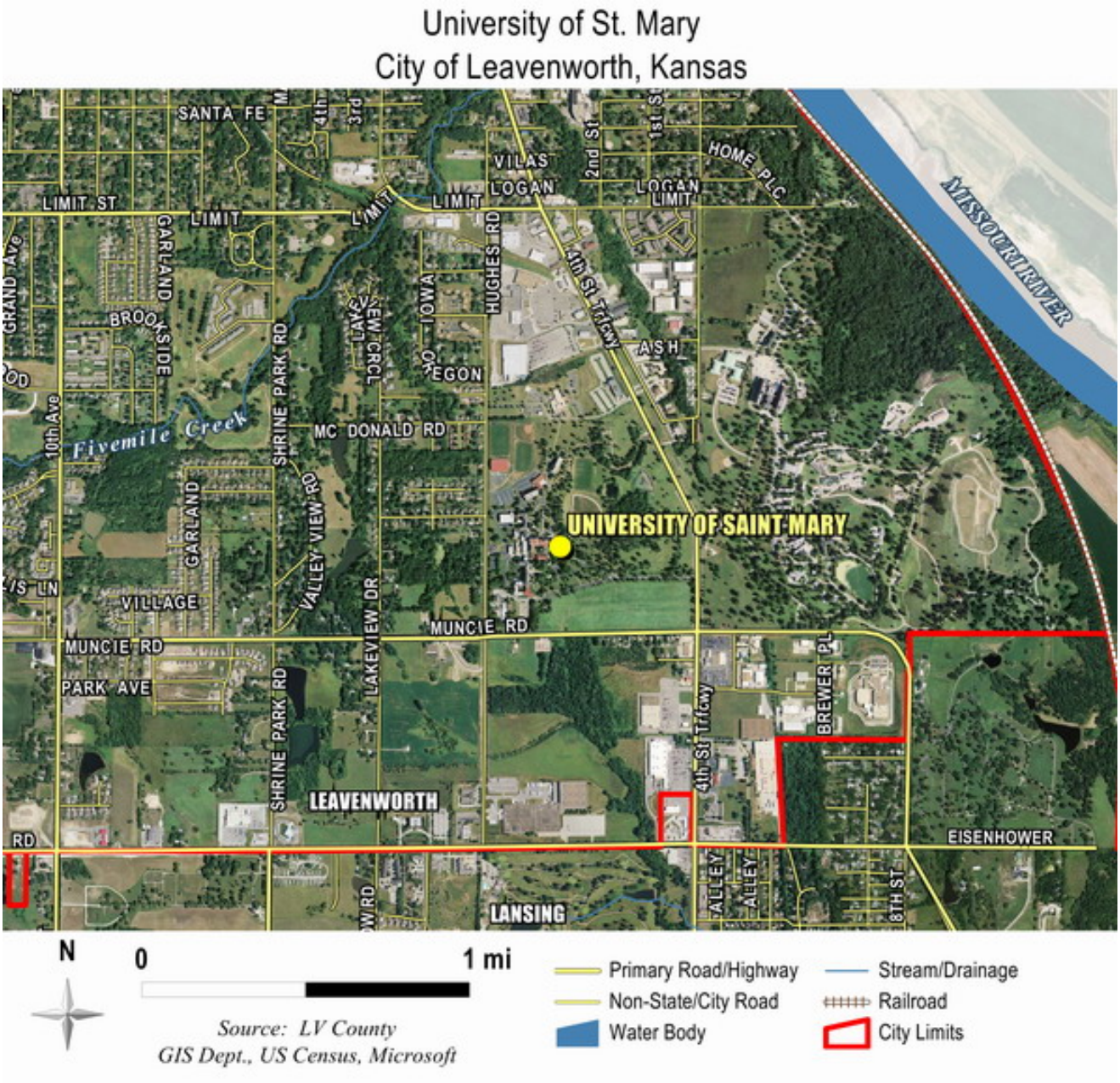
Leavenworth, Kansas




Linwood, Kansas
198th ST
LINWOOD RD
LINWOOD
BOWEN ST
PARK ST
ASH ST
Stranger Creek
OLDEN RD
SEVENTH ST
Kansas River
Johnson County
N
0
0.5 mi
Source: LV County GIS Dept., KDOT, US Census, Microsoft
Primary Road/Highway
Non-State/City Road
Railroad
City Limits
County Line
Water Body
Stream/Drainage

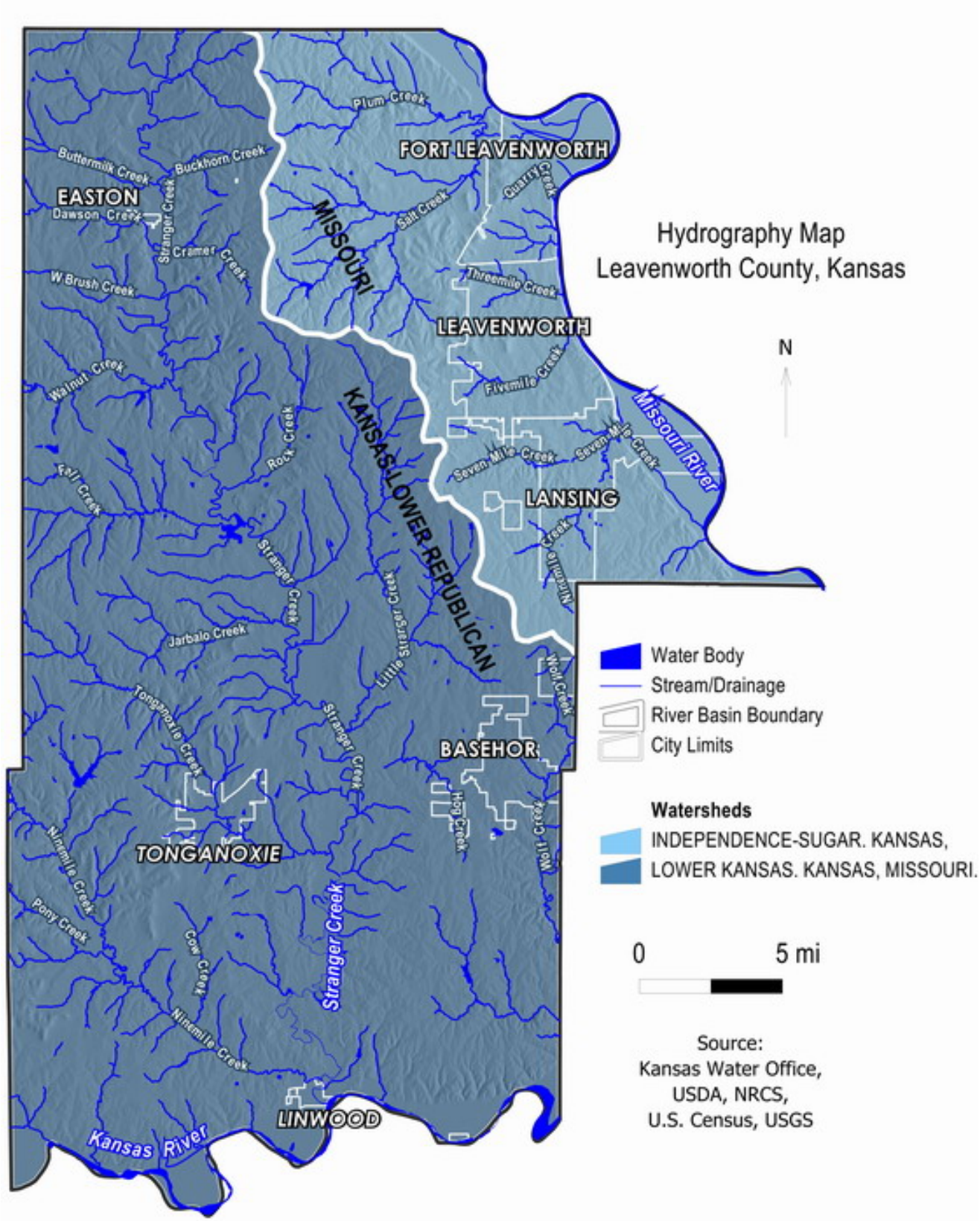
Tonganoxie, Kansas

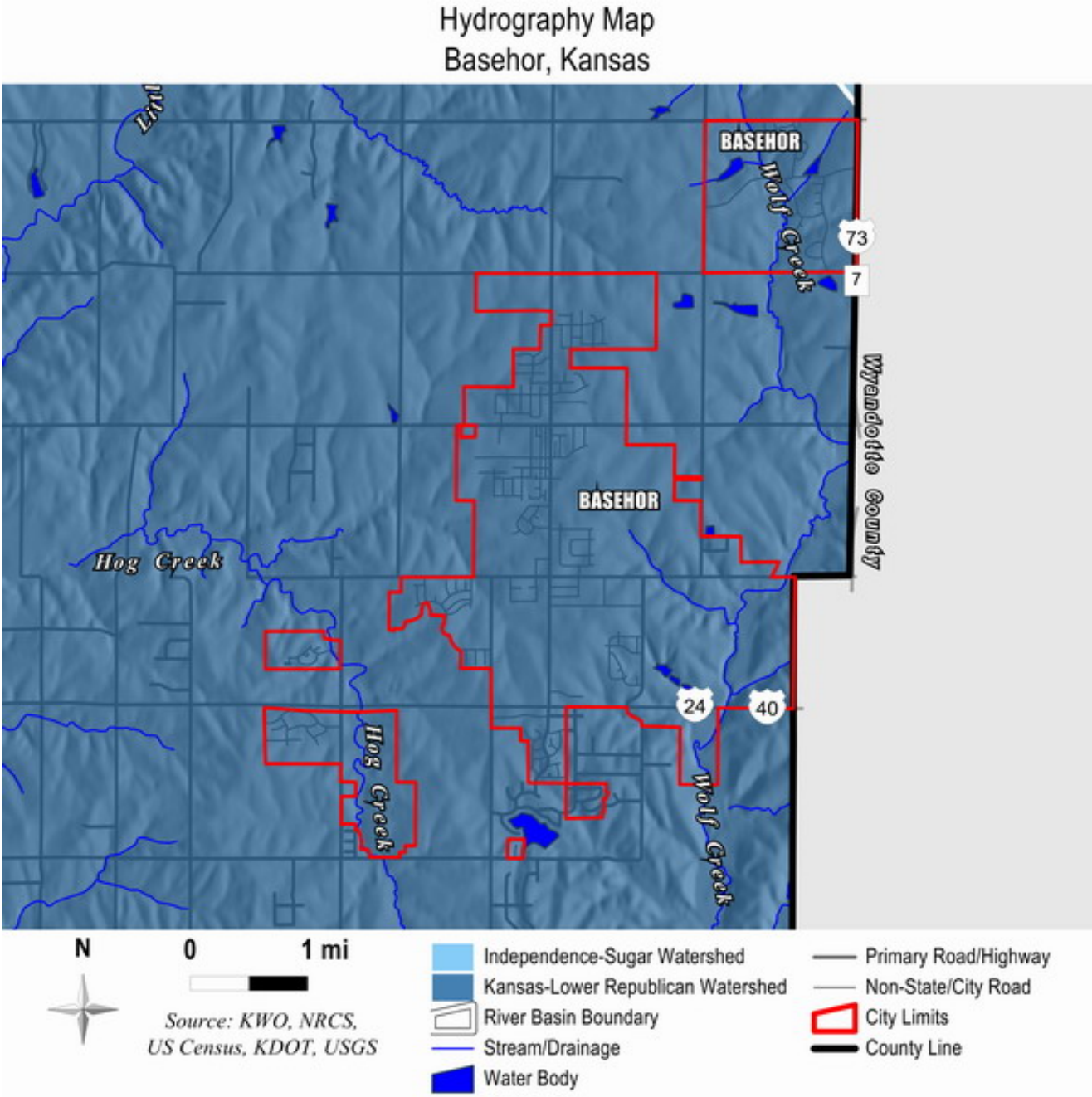


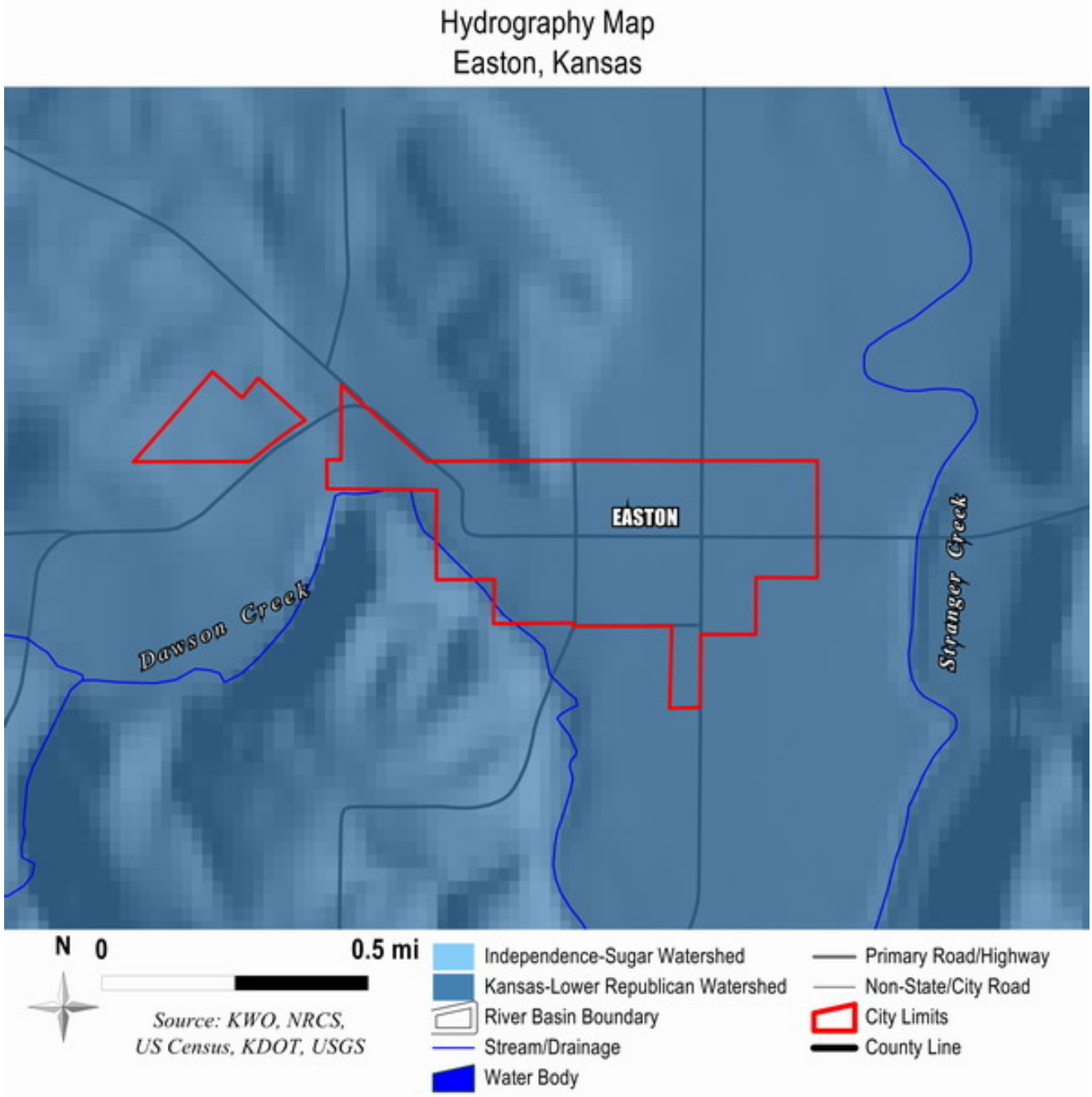


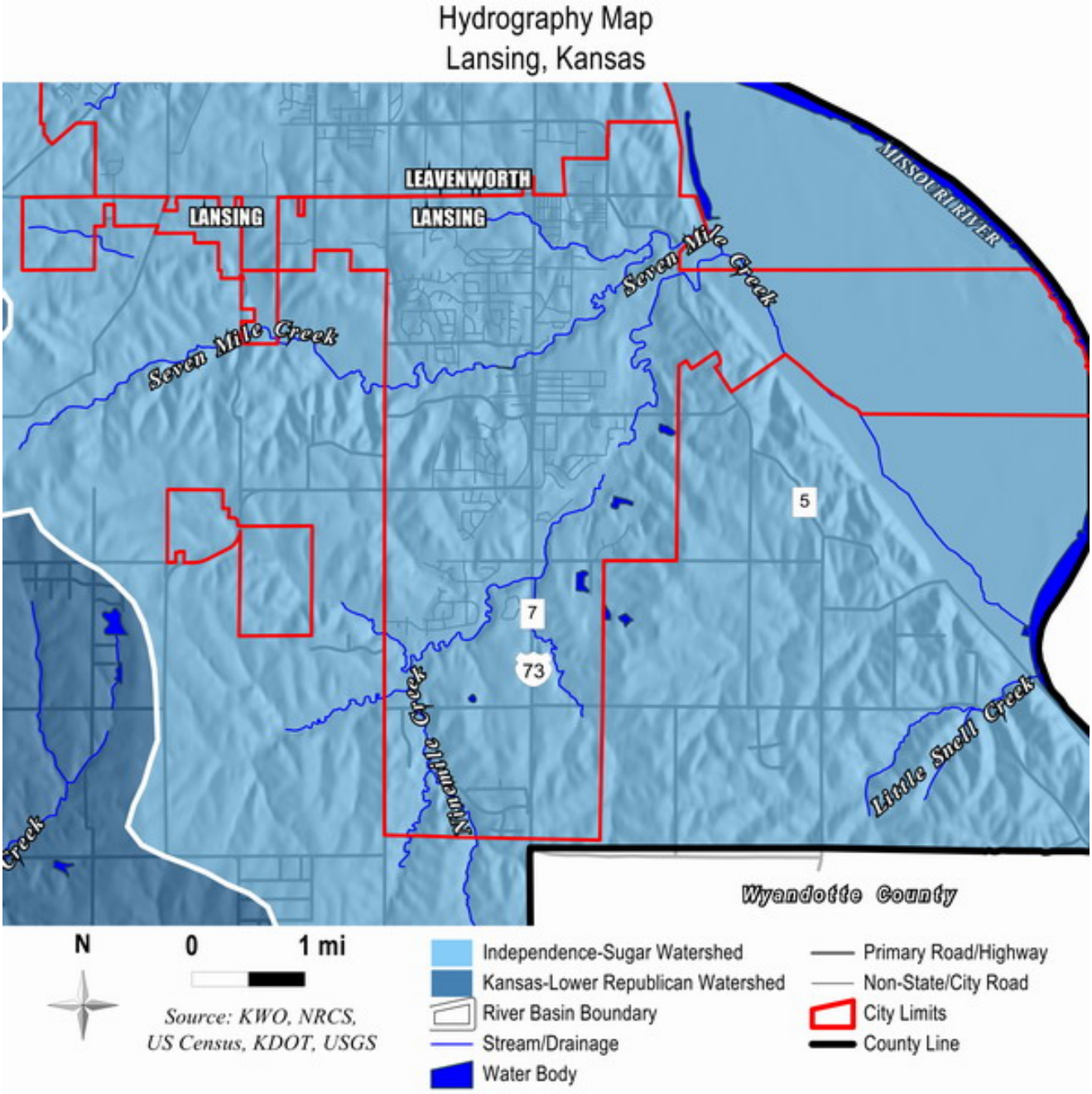

## 2. Regional Hydrography

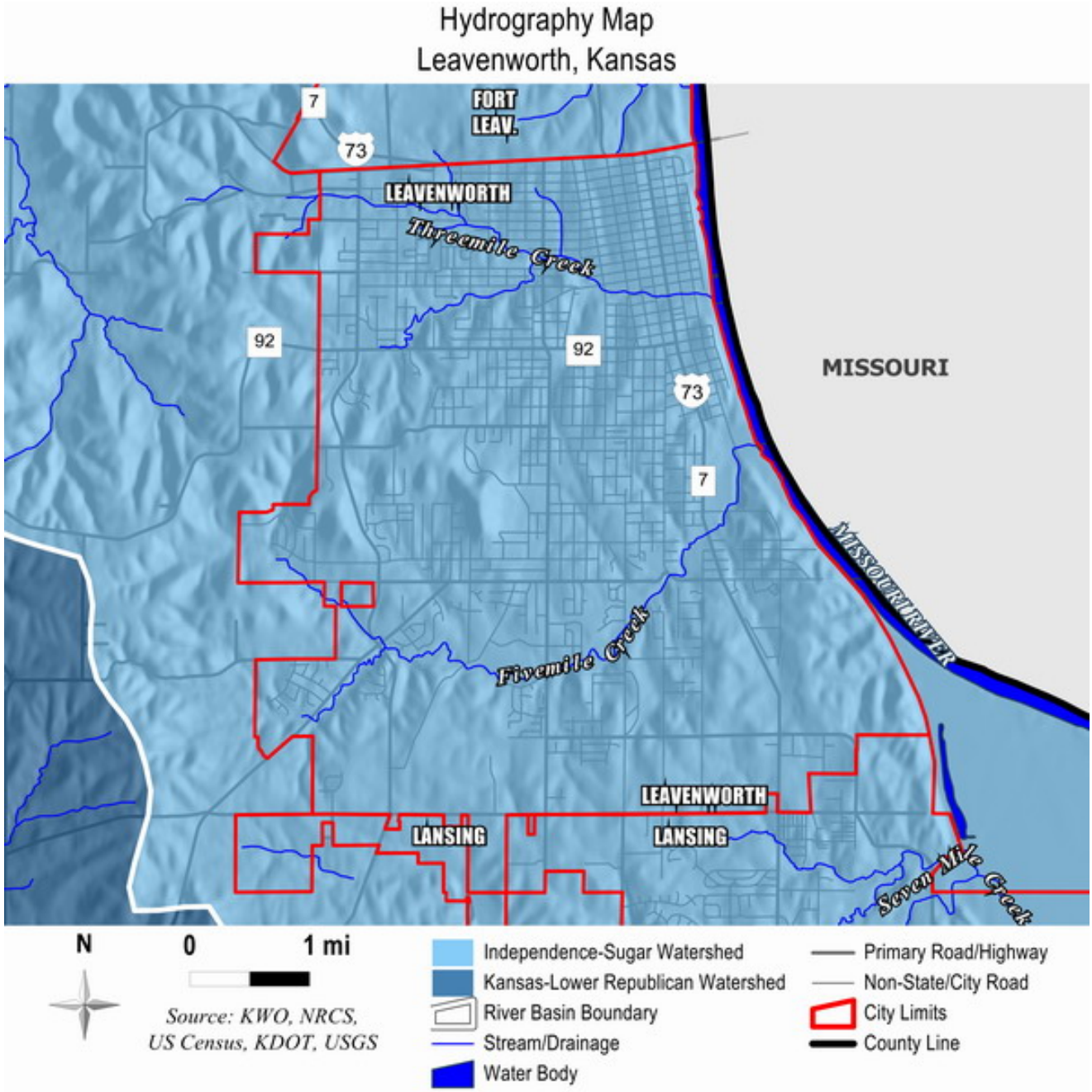
The following maps display the surface water features that form the drainage network for Leavenworth County. Two river basins are designated by the Kansas Water Office: the Kansas-Lower Republican River Basin and the Missouri River Basin. Two watersheds are designated by the Environmental Protection Agency: the Independence-Sugar and the Lower Kansas.

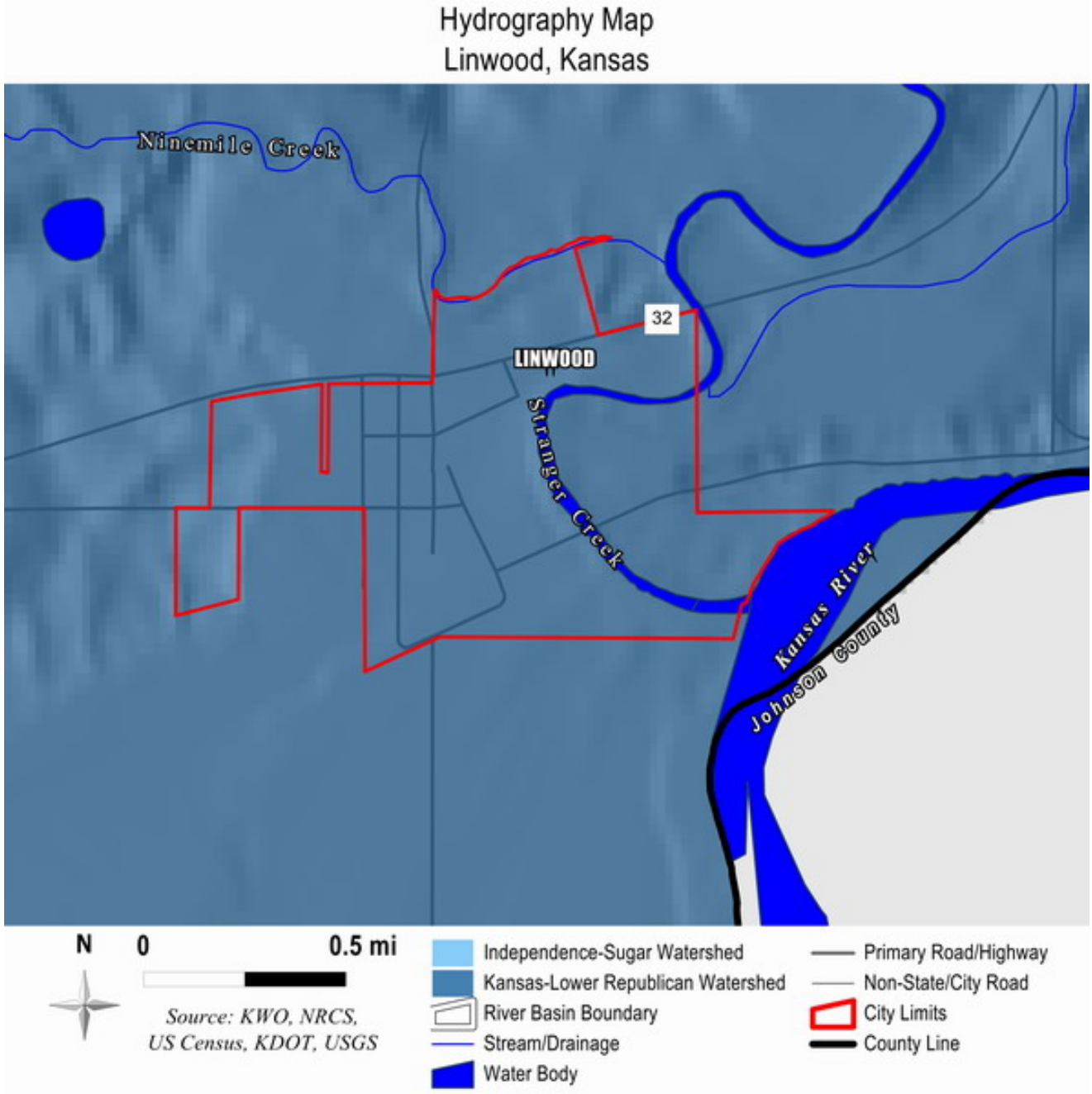

Hydrography Map
Leavenworth County, Kansas
N
Water Body
Stream/Drainage
River Basin Boundary
City Limits
Watersheds
INDEPENDENCE-SUGAR. KANSAS,
LOWER KANSAS. KANSAS, MISSOURI.
0
5 mi
Source:
Kansas Water Office,
USDA, NRCS,
U.S. Census, USGS
FORT LEAVENWORTH
EASTON
LEAVENWORTH
LANSING
BASEHOR
TONGANOXIE
LINWOOD
MISSOURI
KANSAS LOWER REPUBLICAN
Missouri River
Kansas River
Stranger Creek
Plum Creek
Buttermilk Creek
Buckhorn Creek
Dawson Creek
Cramer Creek
W Brush Creek
Walnut Creek
Fall Creek
Rock Creek
Salt Creek
Quarry Creek
Threemile Creek
Fivemile Creek
Seven Mile Creek
Jarbalo Creek
Little Stranger Creek
Tonganoxie Creek
Ninemile Creek
Pony Creek
Cow Creek
Hog Creek
Wolf Creek

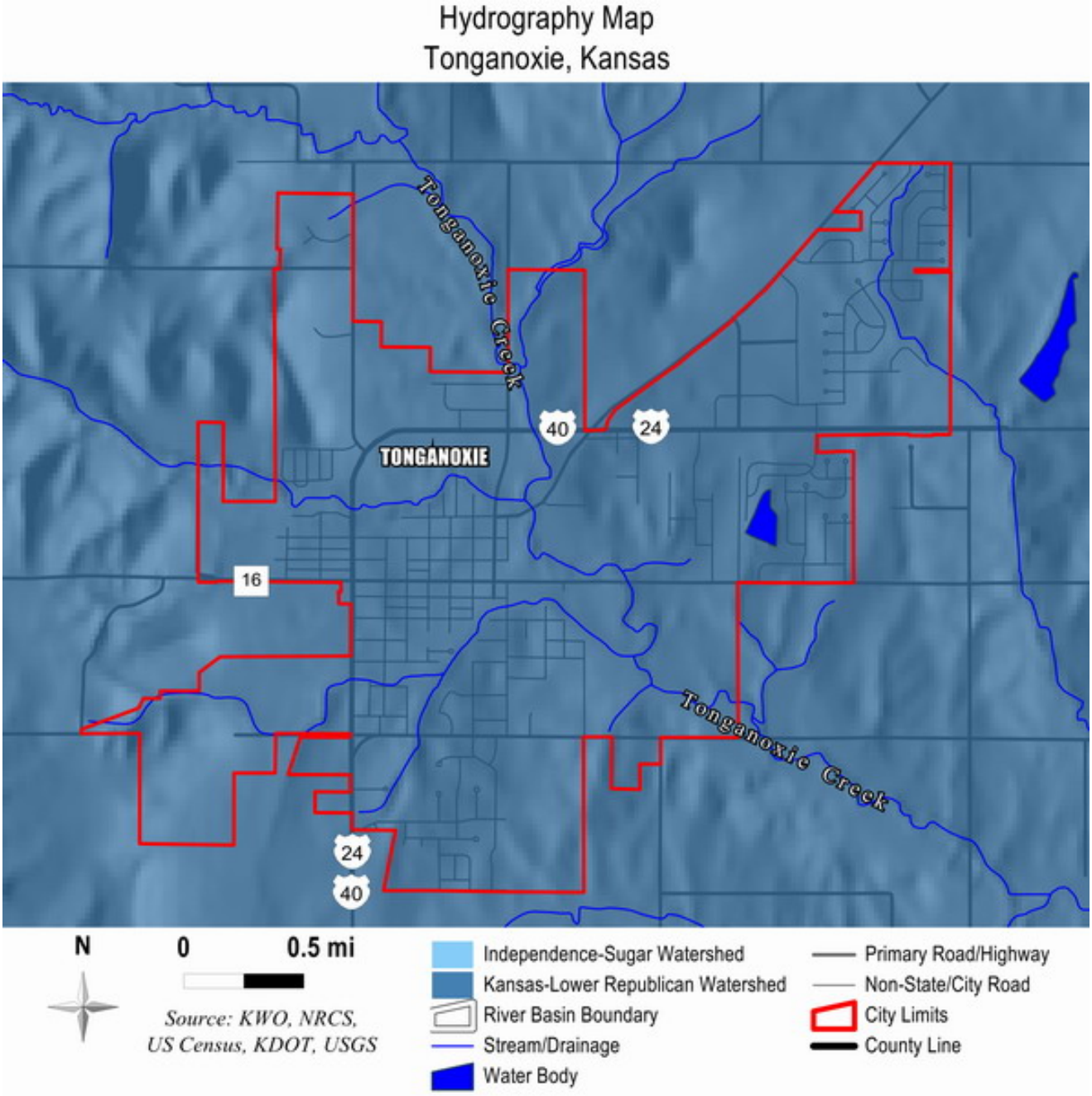

Hydrography Map
Basehor, Kansas
BASEHOR
Wolf Creek
73
7
Wyandotte County
BASEHOR
Hog Creek
24
40
Hog Creek
Wolf Creek
N
0
1 mi
Source: KWO, NRCS, US Census, KDOT, USGS
Independence-Sugar Watershed
Kansas-Lower Republican Watershed
River Basin Boundary
Stream/Drainage
Water Body
Primary Road/Highway
Non-State/City Road
City Limits
County Line


Hydrography Map
Easton, Kansas
EASTON
Dawson Creek
Stranger Creek
N
0
0.5 mi
Source: KWO, NRCS,
US Census, KDOT, USGS
Independence-Sugar Watershed
Kansas-Lower Republican Watershed
River Basin Boundary
Stream/Drainage
Water Body
Primary Road/Highway
Non-State/City Road
City Limits
County Line


Hydrography Map
Lansing, Kansas
LEAVENWORTH
LANSING
LANSING
MISSOURI RIVER
Seven Mile Creek
Seven Mile Creek
5
7
73
Stranger Creek
Little Shell Creek
Wyandotte County
N
0
1 mi
Source: KWO, NRCS, US Census, KDOT, USGS
Independence-Sugar Watershed
Kansas-Lower Republican Watershed
River Basin Boundary
Stream/Drainage
Water Body
Primary Road/Highway
Non-State/City Road
City Limits
County Line


Hydrography Map
Leavenworth, Kansas
FORT LEAV.
LEAVENWORTH
Threemile Creek
MISSOURI
MISSOURI RIVER
Fivemile Creek
LANSING
LEAVENWORTH
LANSING
Seven Mile Creek
7
73
92
92
73
7
N
0
1 mi
Source: KWO, NRCS, US Census, KDOT, USGS
Independence-Sugar Watershed
Kansas-Lower Republican Watershed
River Basin Boundary
Stream/Drainage
Water Body
Primary Road/Highway
Non-State/City Road
City Limits
County Line


Hydrography Map
Linwood, Kansas
Ninemile Creek
32
LINWOOD
Stranger Creek
Kansas River
Johnson County
N
0
0.5 mi
Source: KWO, NRCS, US Census, KDOT, USGS
Independence-Sugar Watershed
Kansas-Lower Republican Watershed
River Basin Boundary
Stream/Drainage
Water Body
Primary Road/Highway
Non-State/City Road
City Limits
County Line

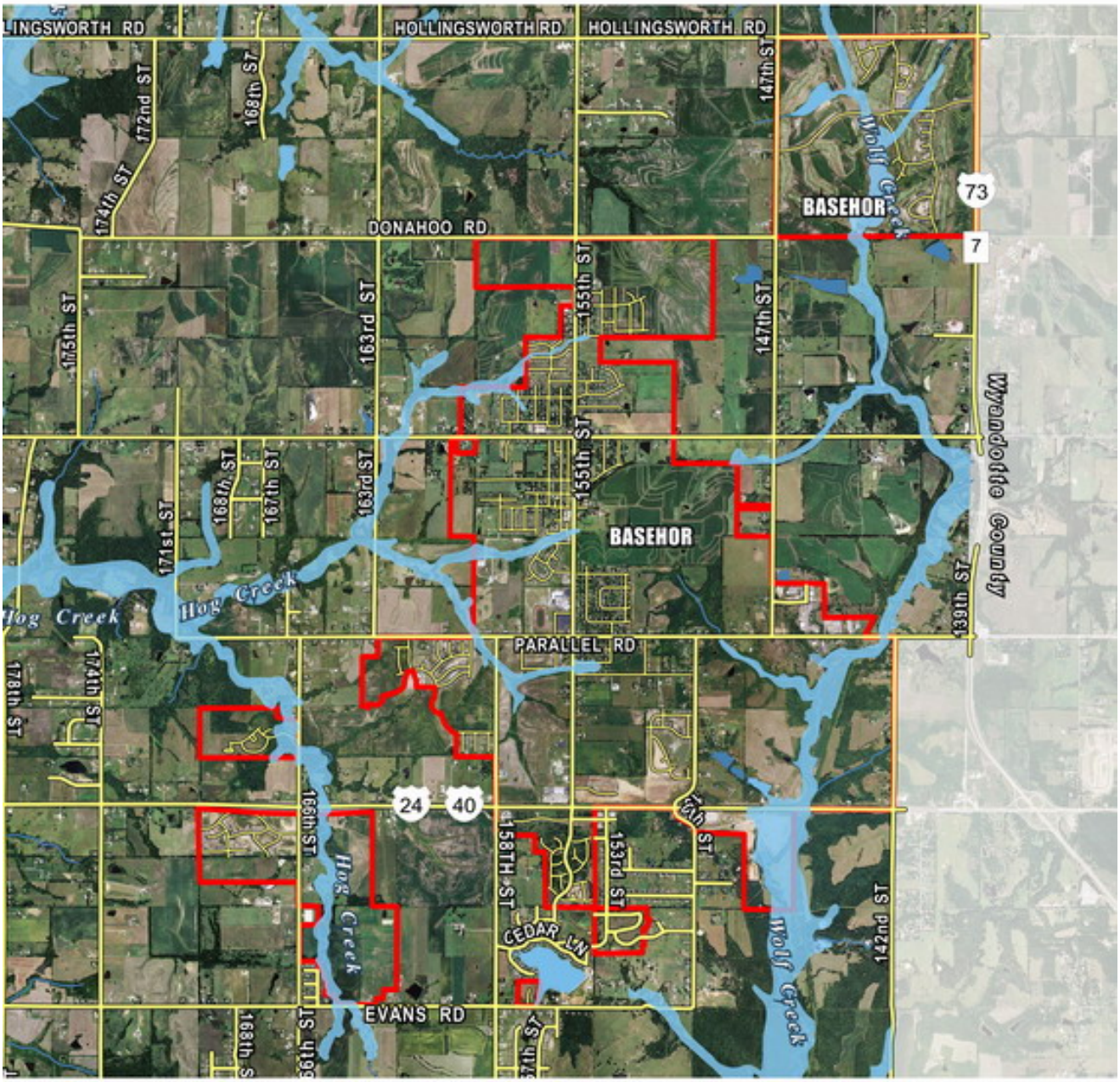



## 3. Flood Hazard Areas

The following maps display the Special Flood Hazard Areas (SFHAs) in Leavenworth County as delineated by the Federal Emergency Management Agency through their Flood Insurance Rate Maps. SFHAs are defined by one of the following: (1) areas inundated by 100-year flooding, for which no base flood elevations (BFEs) have been determined, (2) areas inundated by 100-year flooding for which BFEs have been determined, or (3) areas inundated by 100-year flooding with velocity hazard (wave action); BFEs have been determined.

SFHAs are shaded blue or yellow on the following maps. Some SFHAs include floodways (yellow areas), which are defined as areas that include the channel of a river or other watercourse.

# FEMA Special Flood Hazard Areas
## Basehor, Kansas



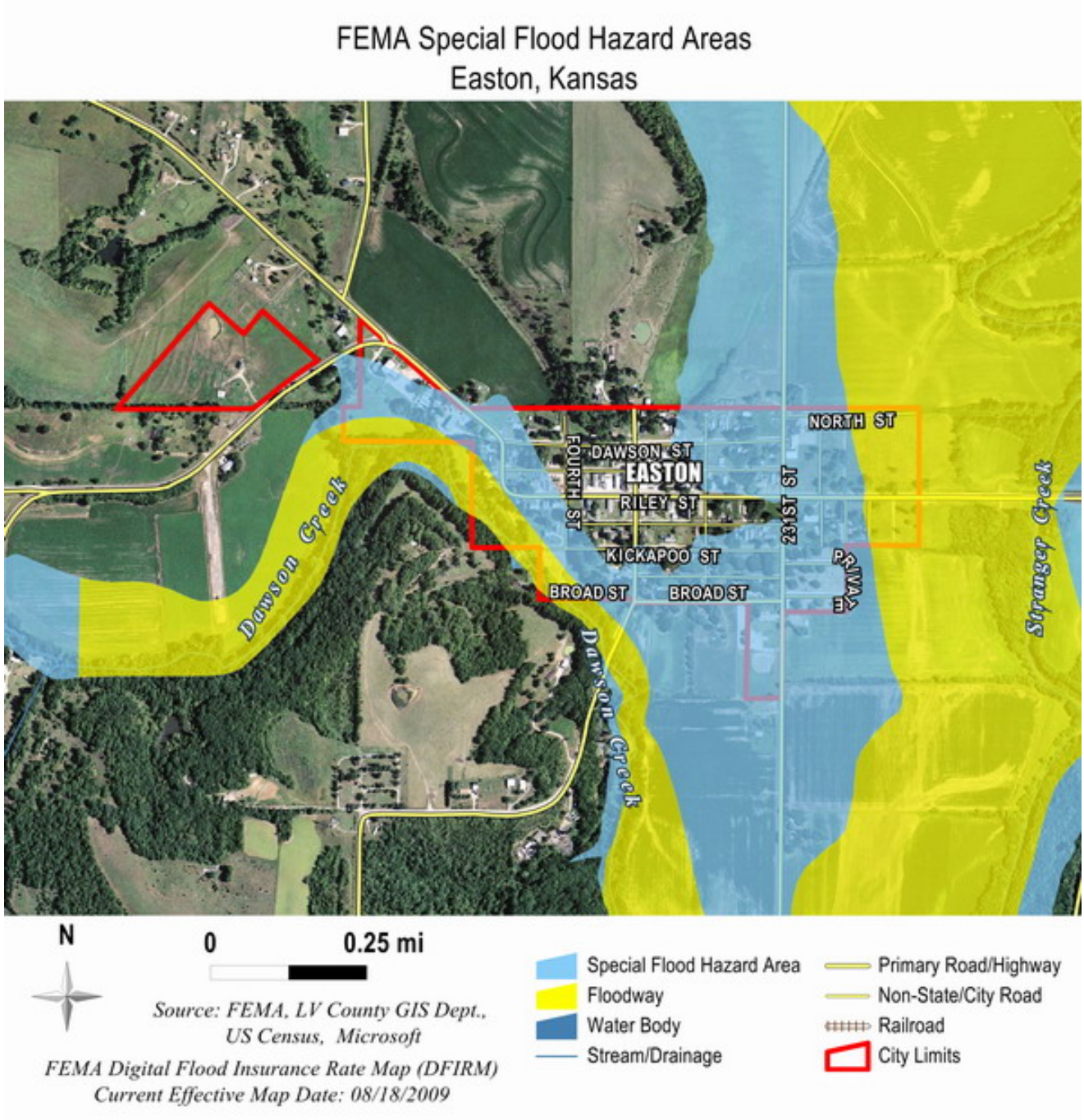

N

0 1 mi

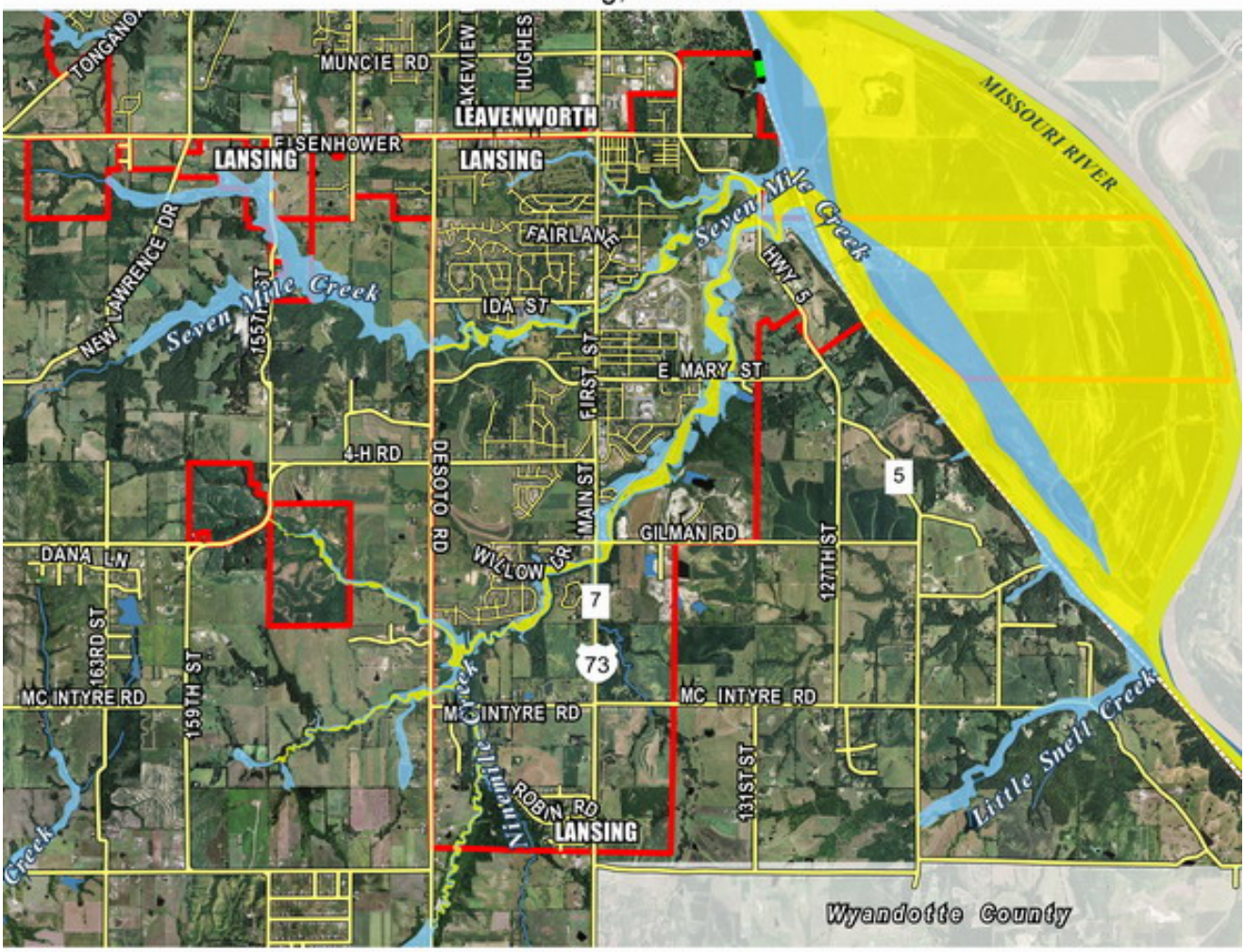
*Source: FEMA, LV County GIS Dept., US Census, Microsoft*

Special Flood Hazard Area
Floodway
Water Body
Stream/Drainage
Primary Road/Highway
Non-State/City Road
Railroad
City Limits

*FEMA Digital Flood Insurance Rate Map (DFIRM)*
*Current Effective Map Date: 08/18/2009*


FEMA Special Flood Hazard Areas
Easton, Kansas
NORTH ST
DAWSON ST
EASTON
RILEY ST
KICKAPOO ST
BROAD ST
BROAD ST
FOURTH ST
231ST ST
PRIVATE
Dawson Creek
Dawson Creek
Stranger Creek
N
0
0.25 mi
Source: FEMA, LV County GIS Dept., US Census, Microsoft
FEMA Digital Flood Insurance Rate Map (DFIRM)
Current Effective Map Date: 08/18/2009
Special Flood Hazard Area
Floodway
Water Body
Stream/Drainage
Primary Road/Highway
Non-State/City Road
Railroad
City Limits

FEMA Special Flood Hazard Areas
Lansing, Kansas




N

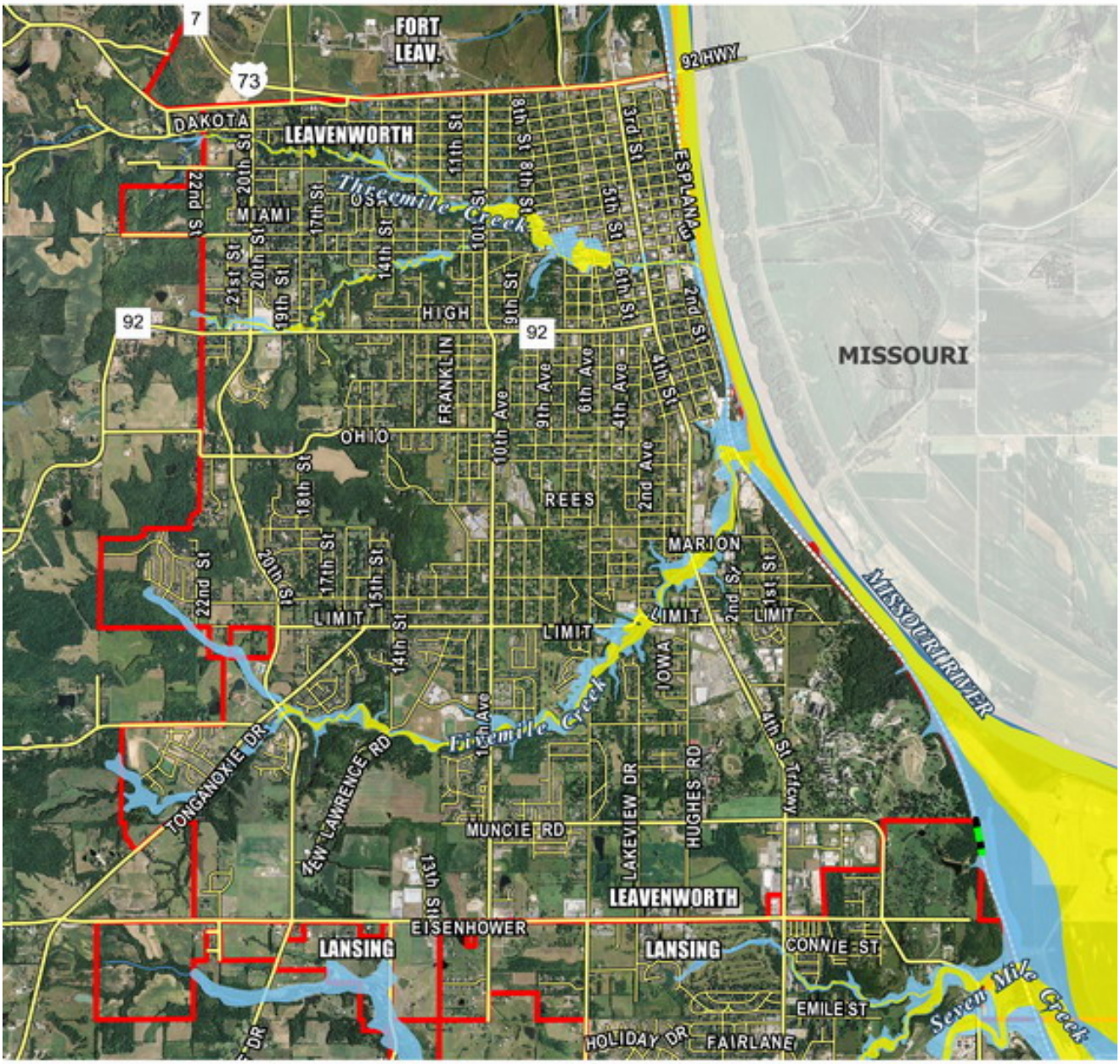
0 1 mi

*Source: FEMA, LV County GIS Dept., US Census, Microsoft*

*FEMA Digital Flood Insurance Rate Map (DFIRM)*
*Current Effective Map Date: 08/18/2009*

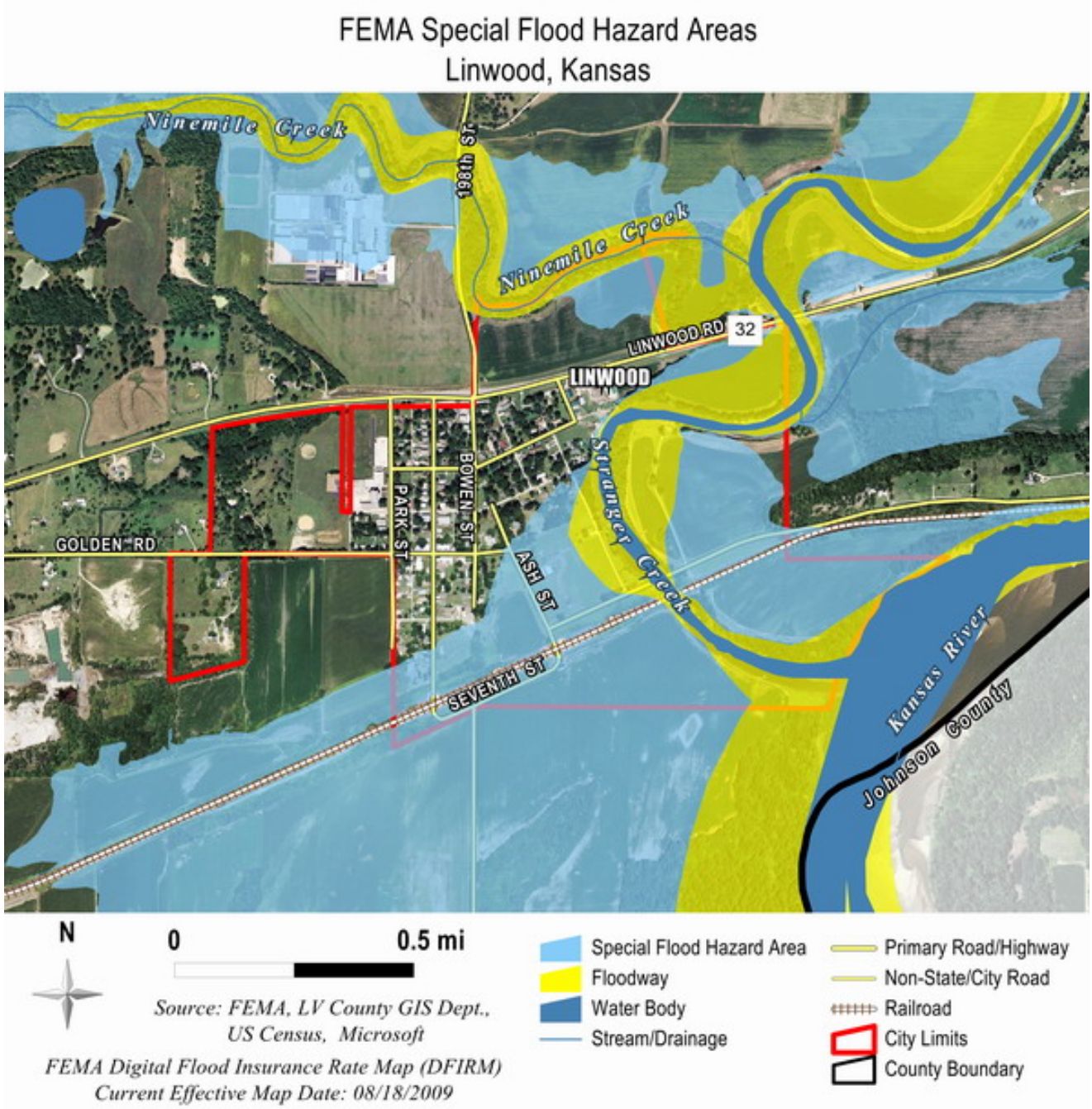
- Special Flood Hazard Area
- Floodway
- Levee
- Water Body
- Stream/Drainage
- Primary Road/Highway
- Non-State/City Road
- Railroad
- City Limits

FEMA Special Flood Hazard Areas
City of Leavenworth, Kansas

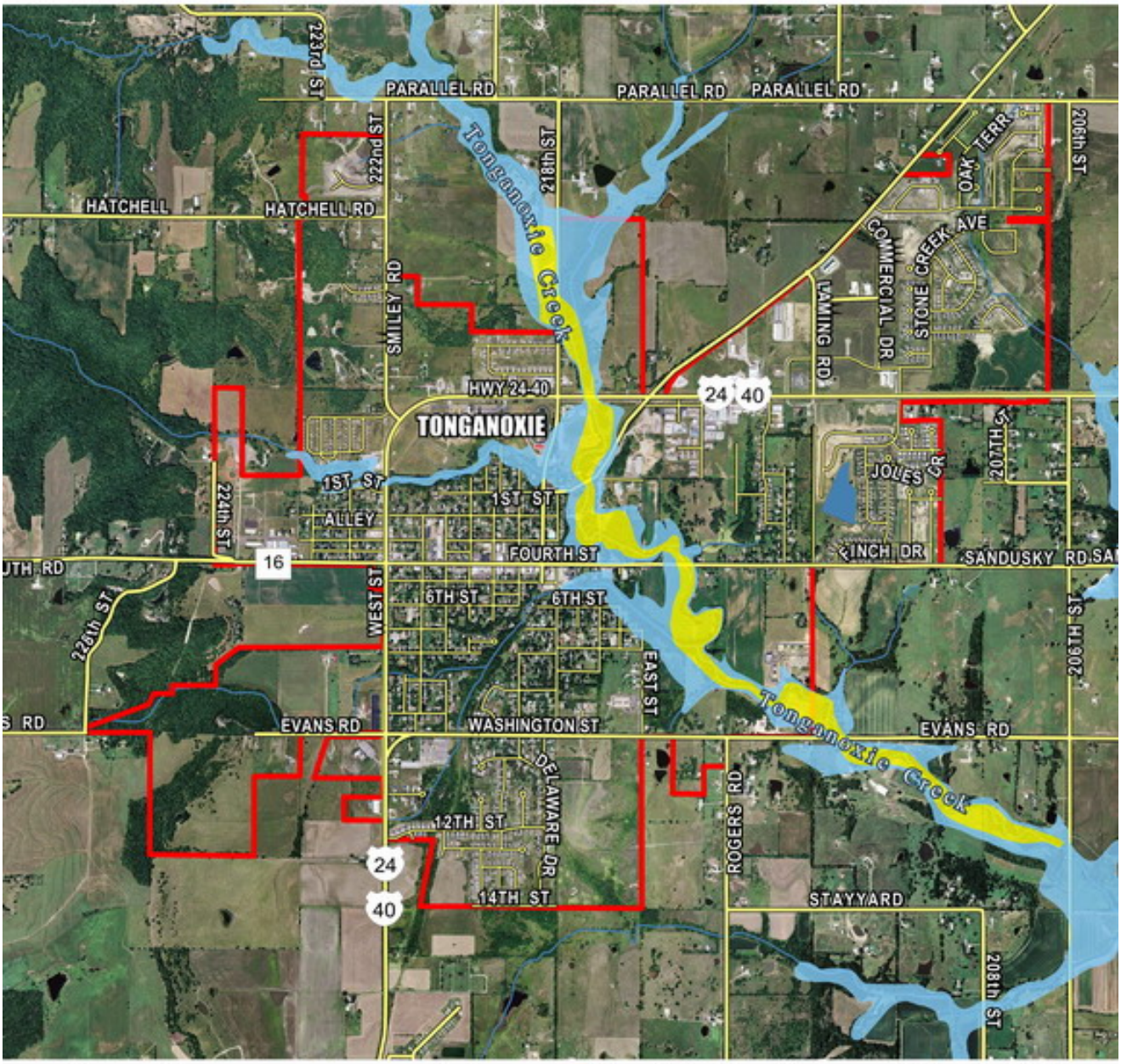



*Source: FEMA, LV County GIS Dept., US Census, Microsoft*

*FEMA Digital Flood Insurance Rate Map (DFIRM)*
*Current Effective Map Date: 08/18/2009*


FEMA Special Flood Hazard Areas
Linwood, Kansas
Ninemile Creek
Ninemile Creek
1980th ST
LINWOOD RD
32
LINWOOD
GOLDEN RD
PARK ST
BOWEN ST
ASH ST
Stranger Creek
SEVENTH ST
Kansas River
Johnson County
N
0
0.5 mi
Source: FEMA, LV County GIS Dept., US Census, Microsoft
FEMA Digital Flood Insurance Rate Map (DFIRM)
Current Effective Map Date: 08/18/2009
Special Flood Hazard Area
Floodway
Water Body
Stream/Drainage
Primary Road/Highway
Non-State/City Road
Railroad
City Limits
County Boundary

# FEMA Special Flood Hazard Areas
## Tonganoxie, Kansas




N

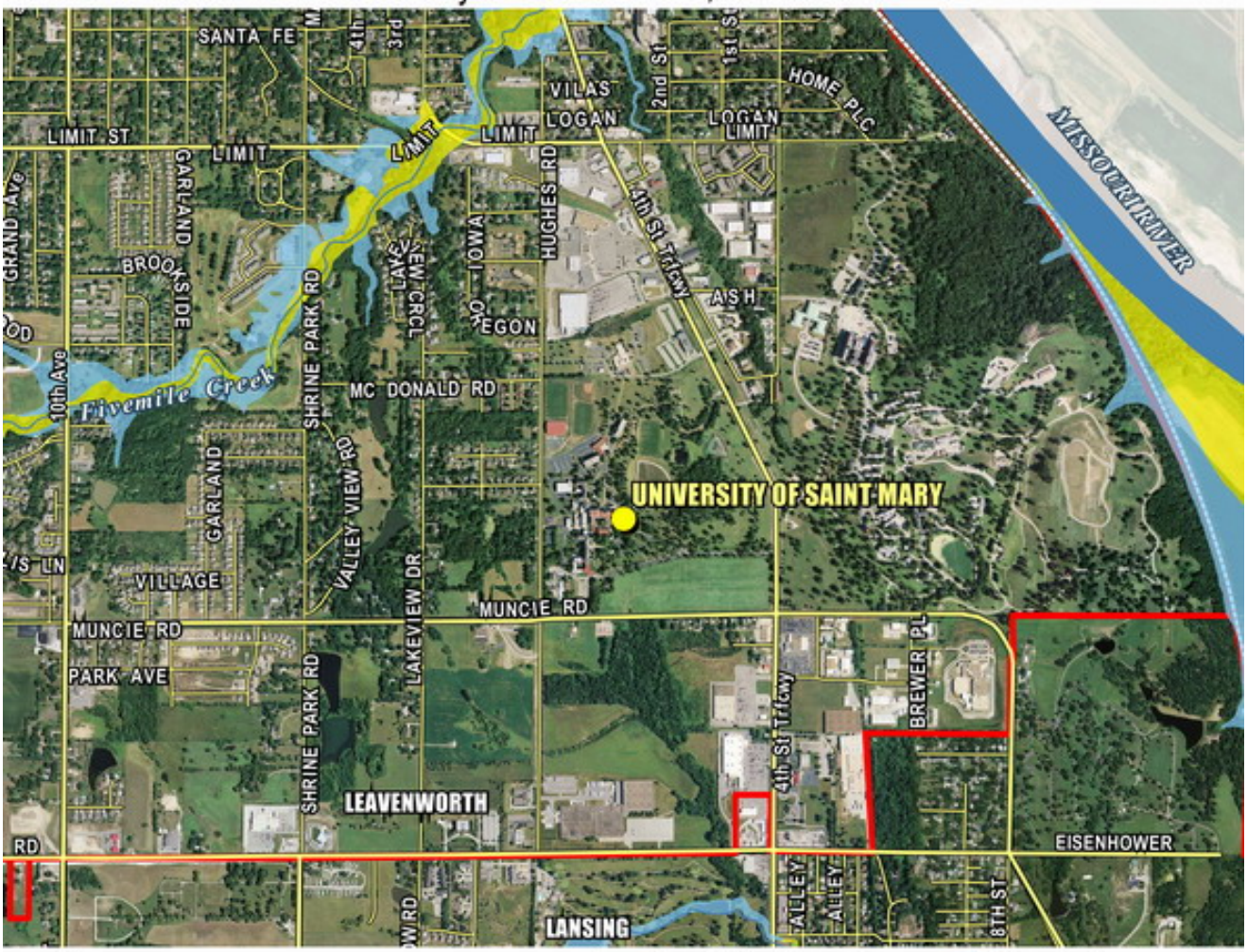
0 1 mi

*Source: FEMA, LV County GIS Dept., US Census, Microsoft*

Special Flood Hazard Area
Floodway
Water Body
Stream/Drainage
Primary Road/Highway
Non-State/City Road
Railroad
City Limits

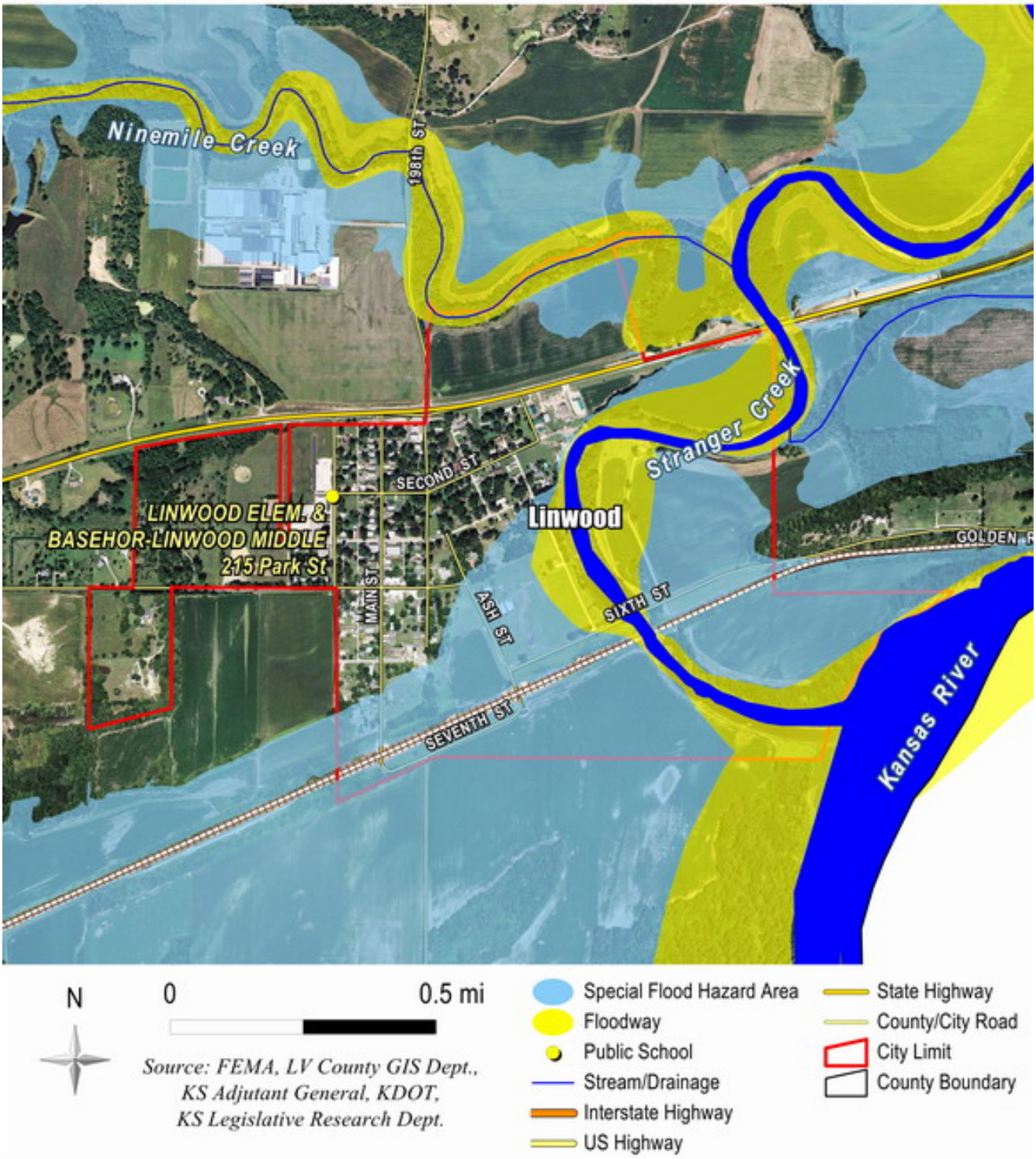
*FEMA Digital Flood Insurance Rate Map (DFIRM)*
*Current Effective Map Date: 08/18/2009*

University of St. Mary & Special Flood Hazard Areas
City of Leavenworth, Kansas

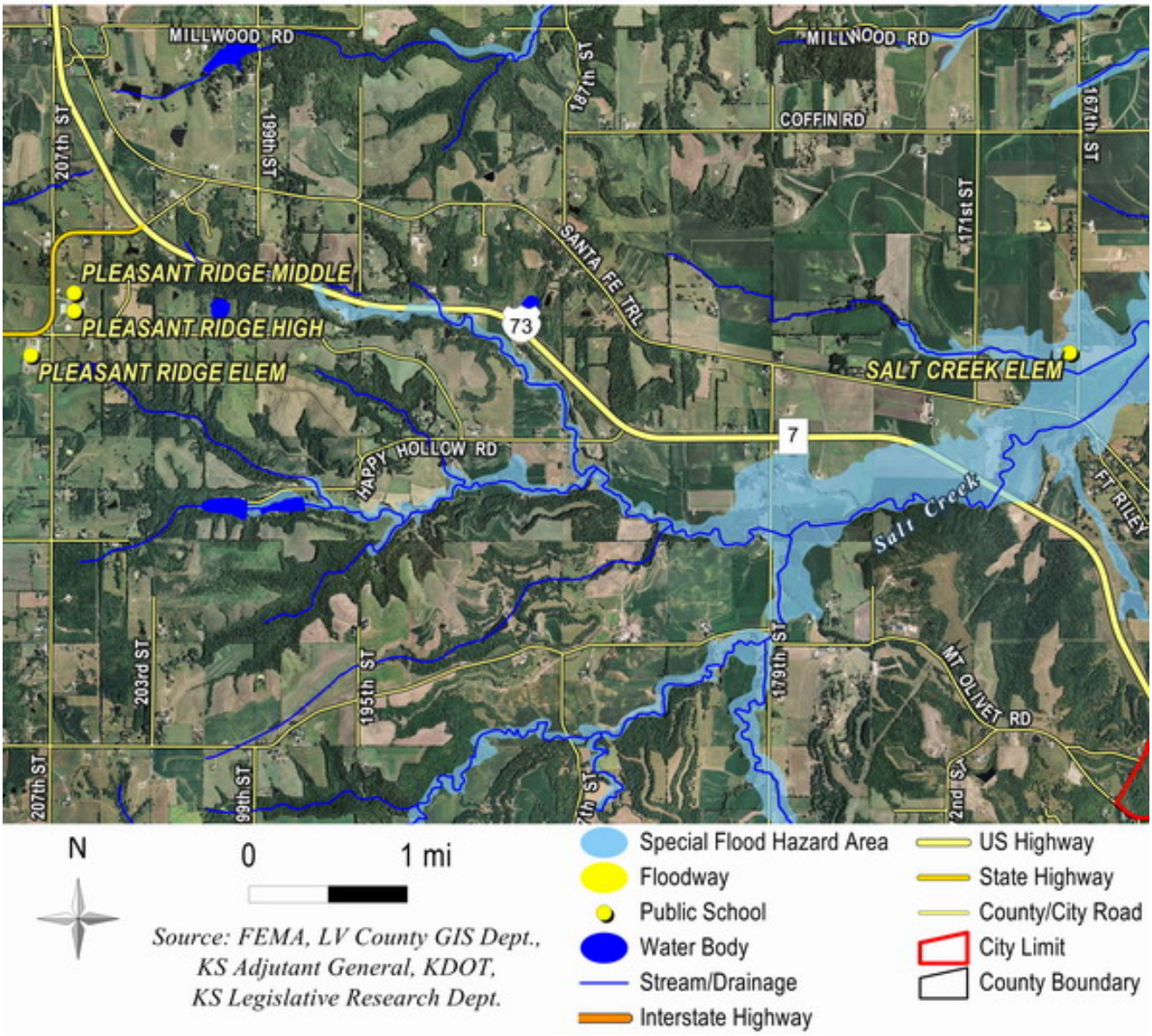


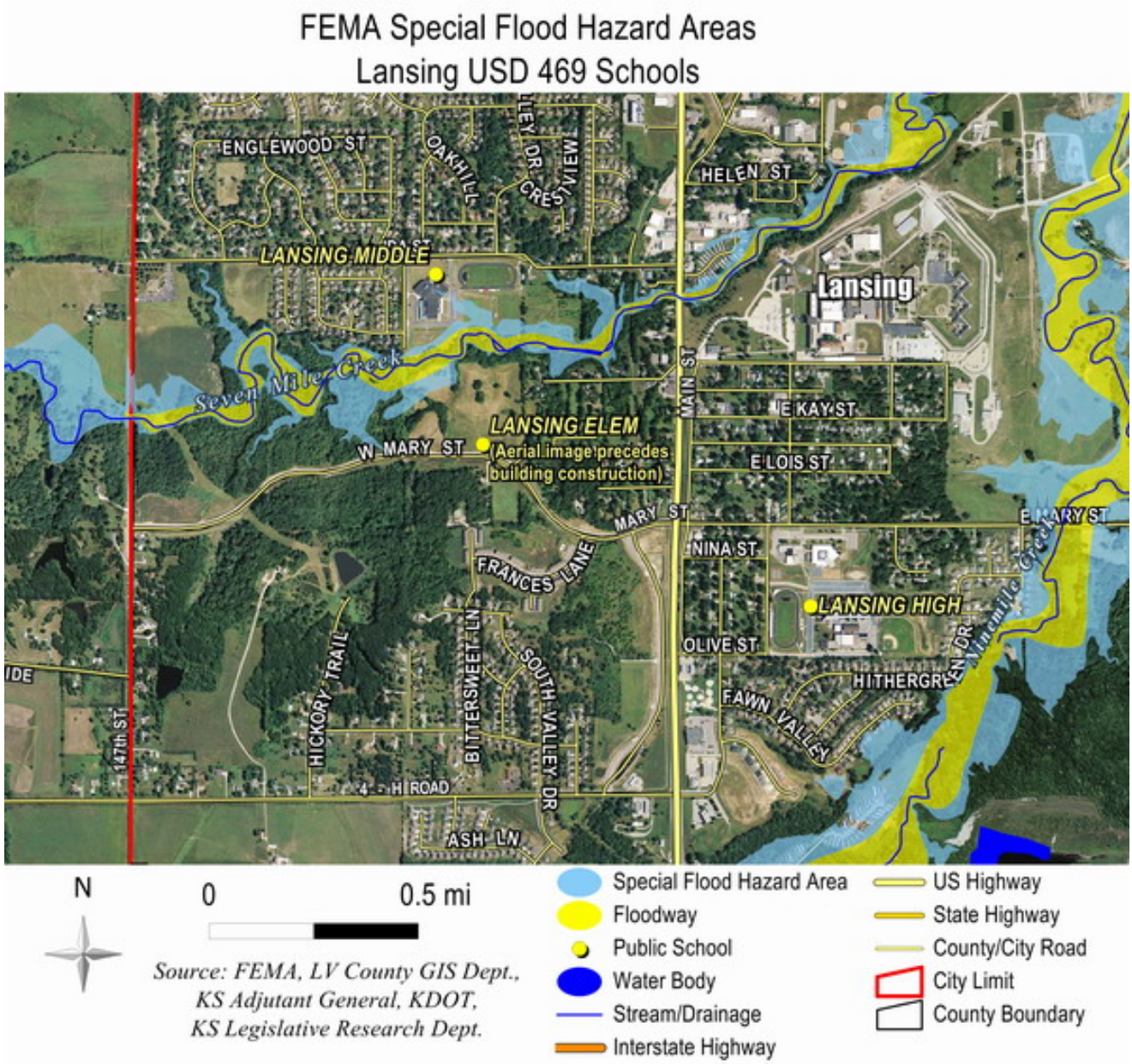

*Source: FEMA, LV County GIS Dept., US Census, Microsoft*
*FEMA Digital Flood Insurance Rate Map (DFIRM)*
*Current Effective Map Date: 08/18/2009*

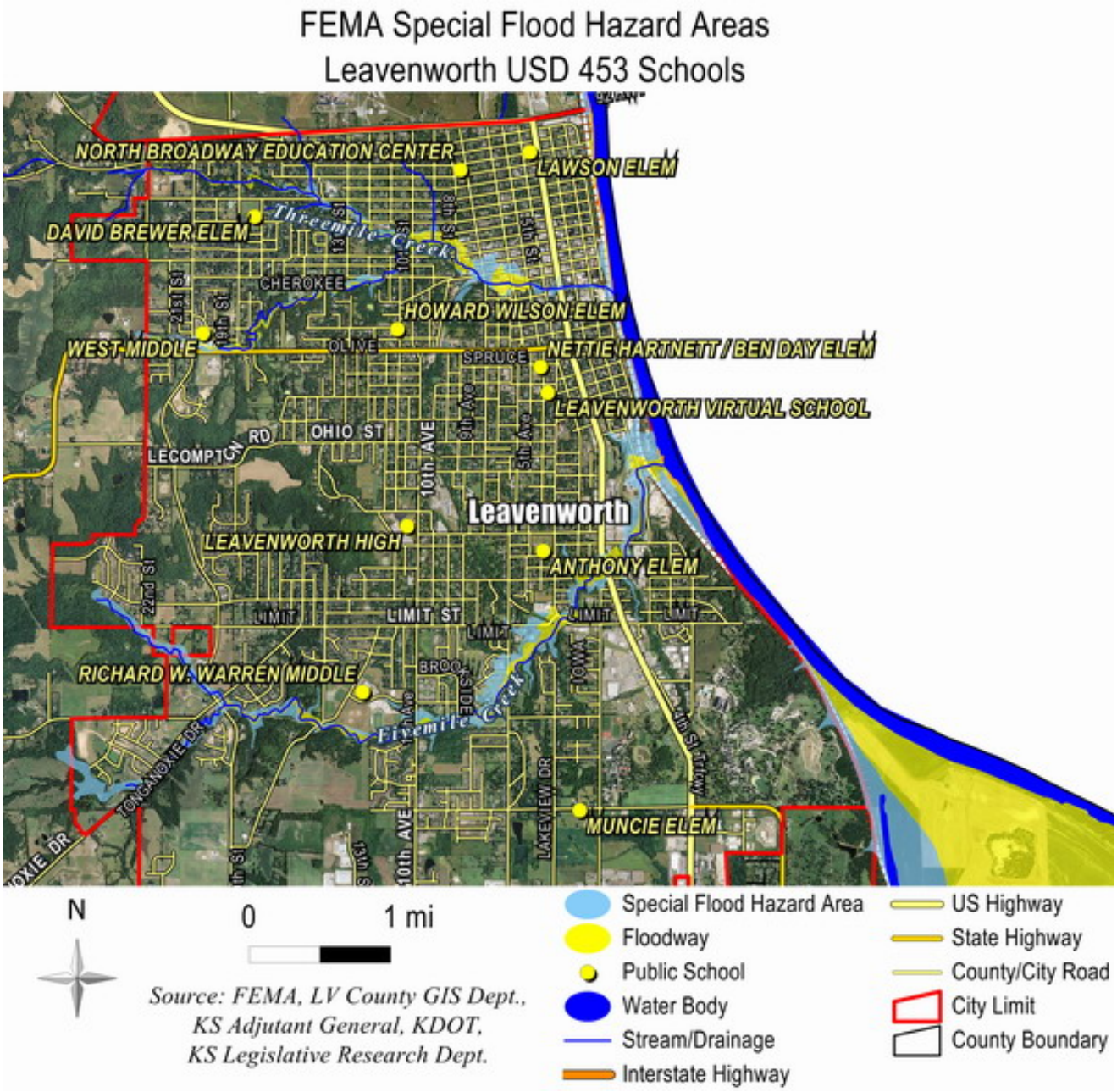
FEMA Special Flood Hazard Areas
Basehor-Linwood USD 458 Schools in Linwood, Kansas



# FEMA Special Flood Hazard Areas
## Easton USD 449 Schools

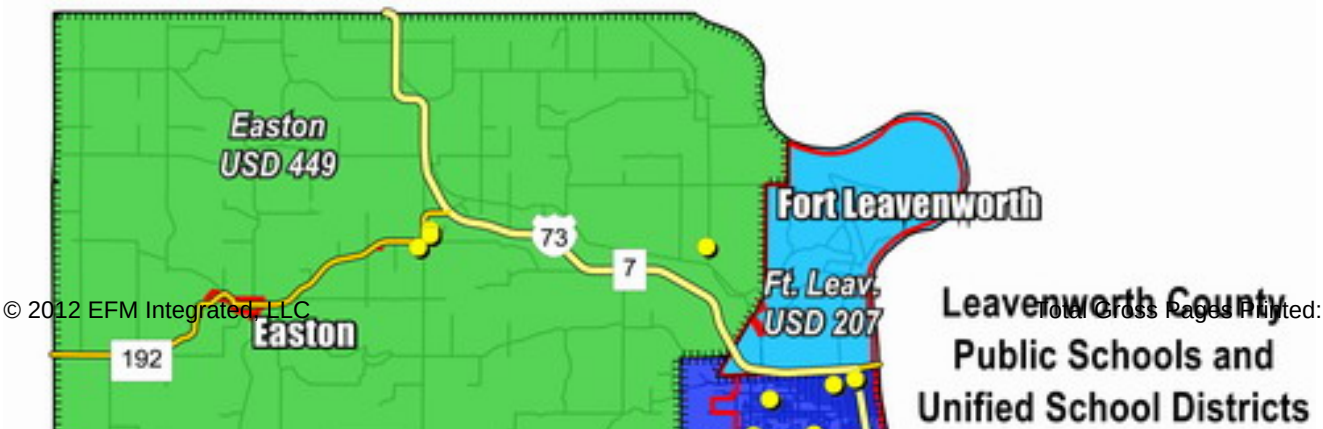



FEMA Special Flood Hazard Areas
Lansing USD 469 Schools
ENGLEWOOD ST
OAKHILL
VIEW
HELEN ST
LANSING MIDDLE
Lansing
Seven Mile Creek
MAIN ST
E KAY ST
LANSING ELEM
(Aerial image precedes building construction)
W MARY ST
E LOIS ST
MARY ST
E MARY ST
NINA ST
FRANCES LANE
LANSING HIGH
Ninemile Creek
OLIVE ST
HITHERGREEN DR
FAWN VALLEY
147th ST
HICKORY TRAIL
BITTERSWEET LN
SOUTH VALLEY DR
H ROAD
ASH LN
N
0
0.5 mi
Source: FEMA, LV County GIS Dept., KS Adjutant General, KDOT, KS Legislative Research Dept.
Special Flood Hazard Area
Floodway
Public School
Water Body
Stream/Drainage
Interstate Highway
US Highway
State Highway
County/City Road
City Limit
County Boundary



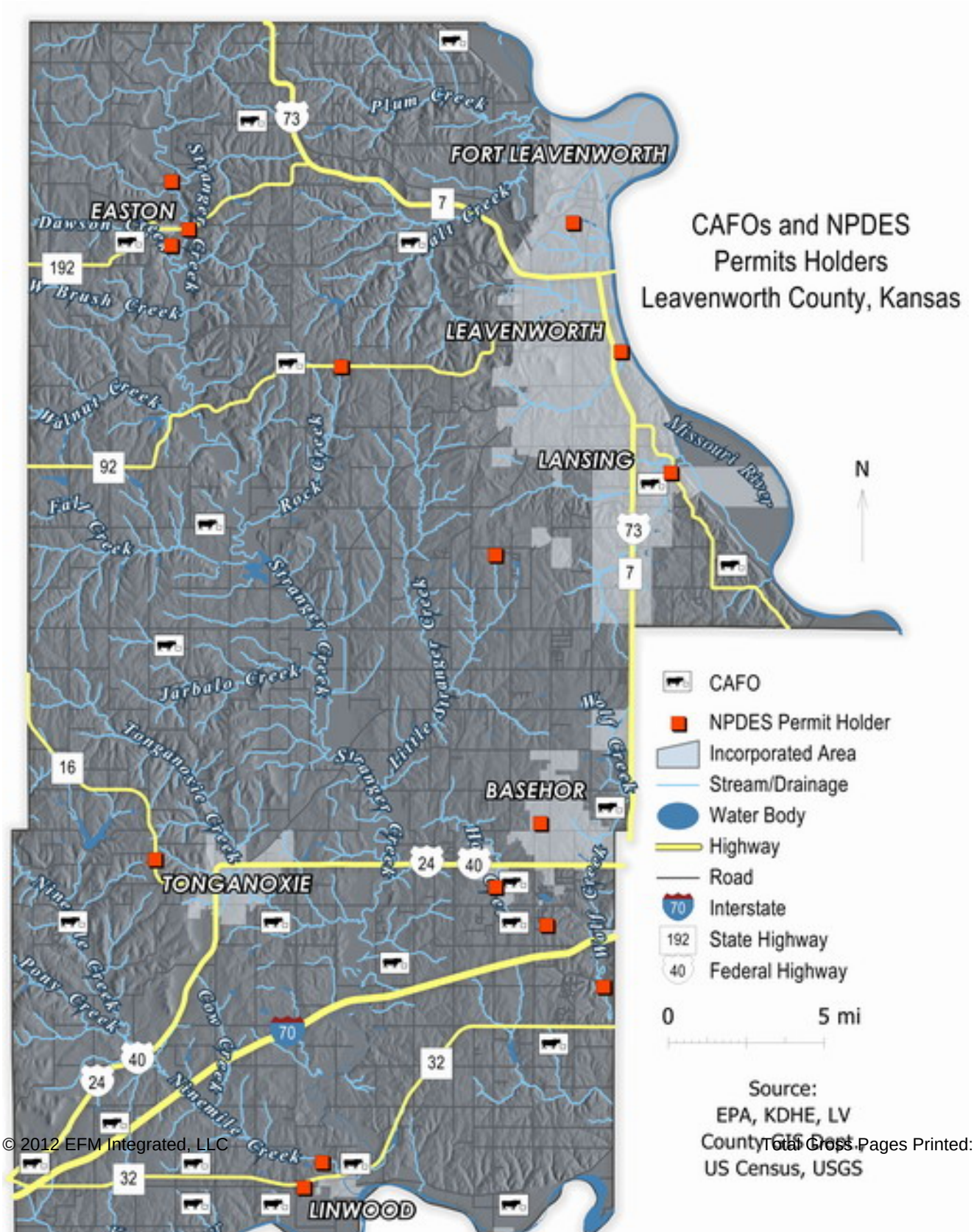

## 4. Public Schools

The following map displays the public schools and unified school districts located in Leavenworth County. USD 469 identified their high school as a designated tornado shelter.



## 5. Pollution Sources

The following maps display the locations of individual National Pollutant Discharge Elimination System (NPDES) sites permitted for wastewater discharges to surface waters in Leavenworth County, as recorded by the Environmental Protection Agency (EPA). The map also displays the locations of Confined Animal Feeding Operations (CAFOs) currently registered with the Kansas Department of Heath and Environment (KDHE).



## 6. High-Hazard Dams & Levees

The following maps show the seven (7) high-hazard dams located in Leavenworth County, including:

Bing's Lake Dam (DLV-0026), owned by Falcon Lakes Homes Association Incorporated;

Lake Hope Dam (DLV-0224), owned by Falcon Lakes Homes Association Incorporated;

Unknown (Runnebaum Dam; DLV-0115), owned by William R. Runnebaum;

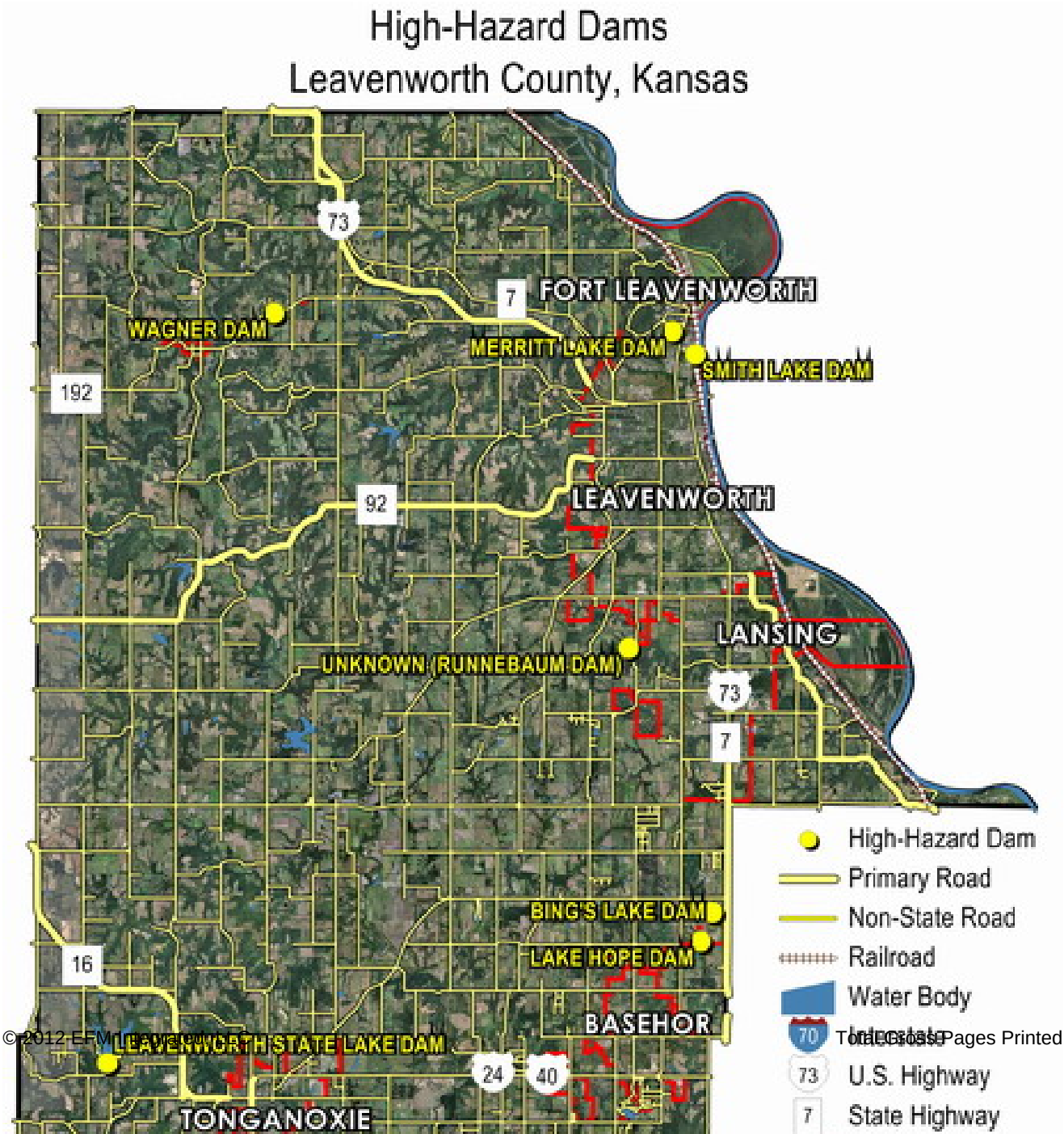
Smith Lake Dam (DLV-0114), owned by the US Army;

Merritt Lake Dam (DLV-0113), owned by the US Army;

Wagner Dam (DLV-0057), owned by Ronald Foster;

Leavenworth Lake Dam (DLV-0124), owned by Kansas Dept. of Wildlife & Parks

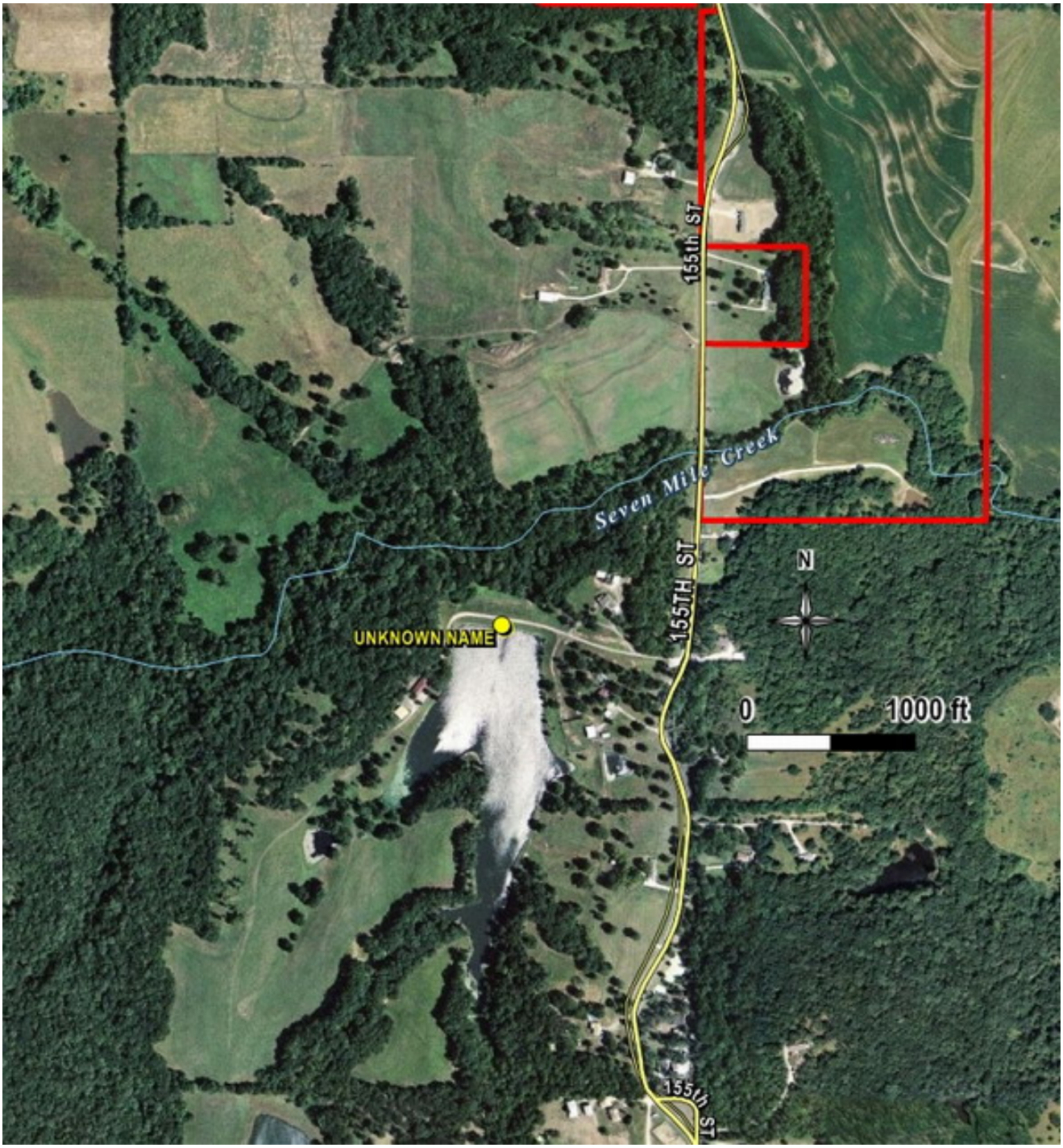
There are an estimated 48 levees identified in Leavenworth County.



Bing's Lake Dam, owned by Falcon Lakes Homes Association Incorporated

Lake Hope Dam, owned by Falcon Lakes Homes Association Incorporated

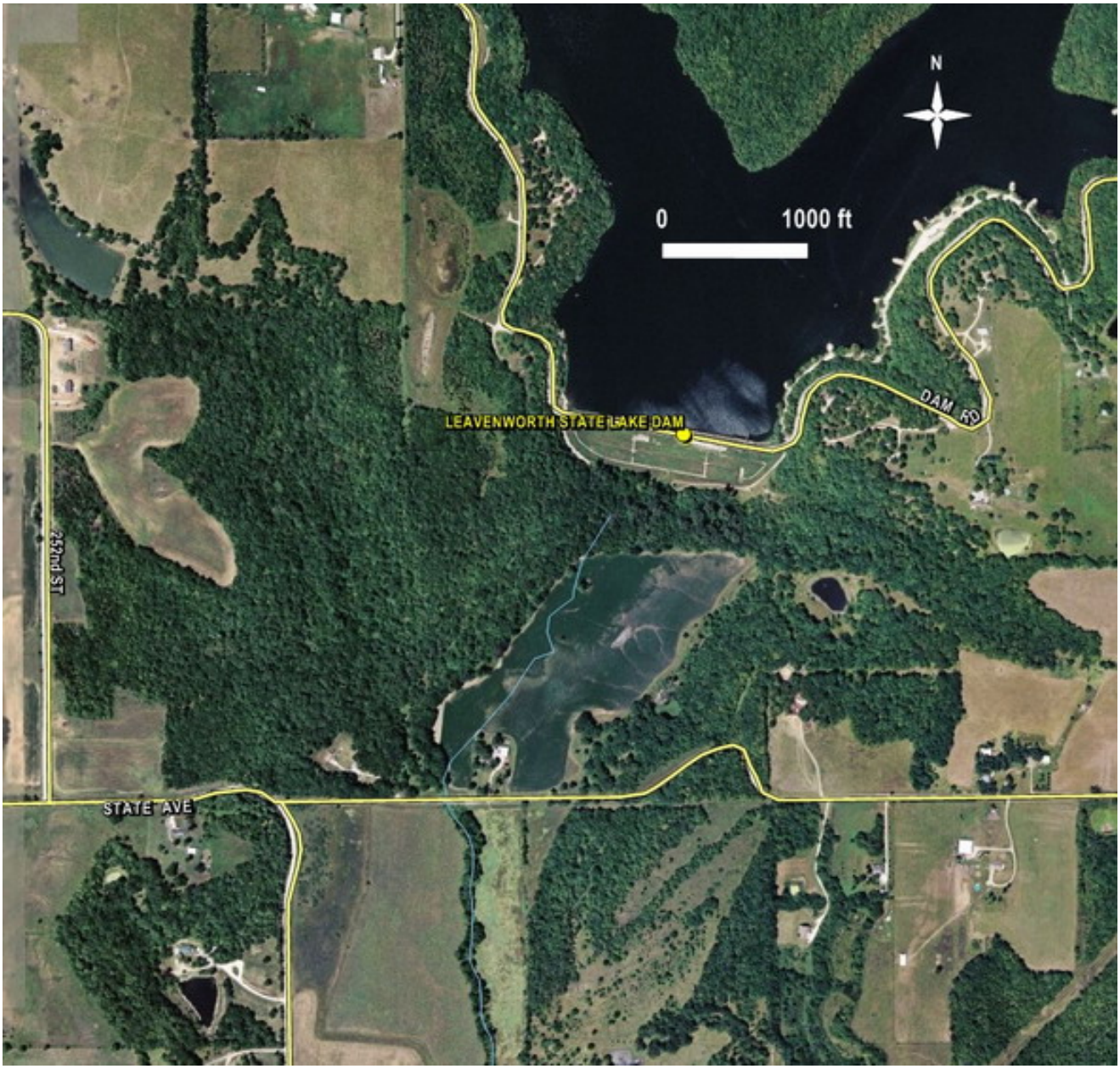
Unknown (Runnebaum Dam), owned by William R. Runnebaum

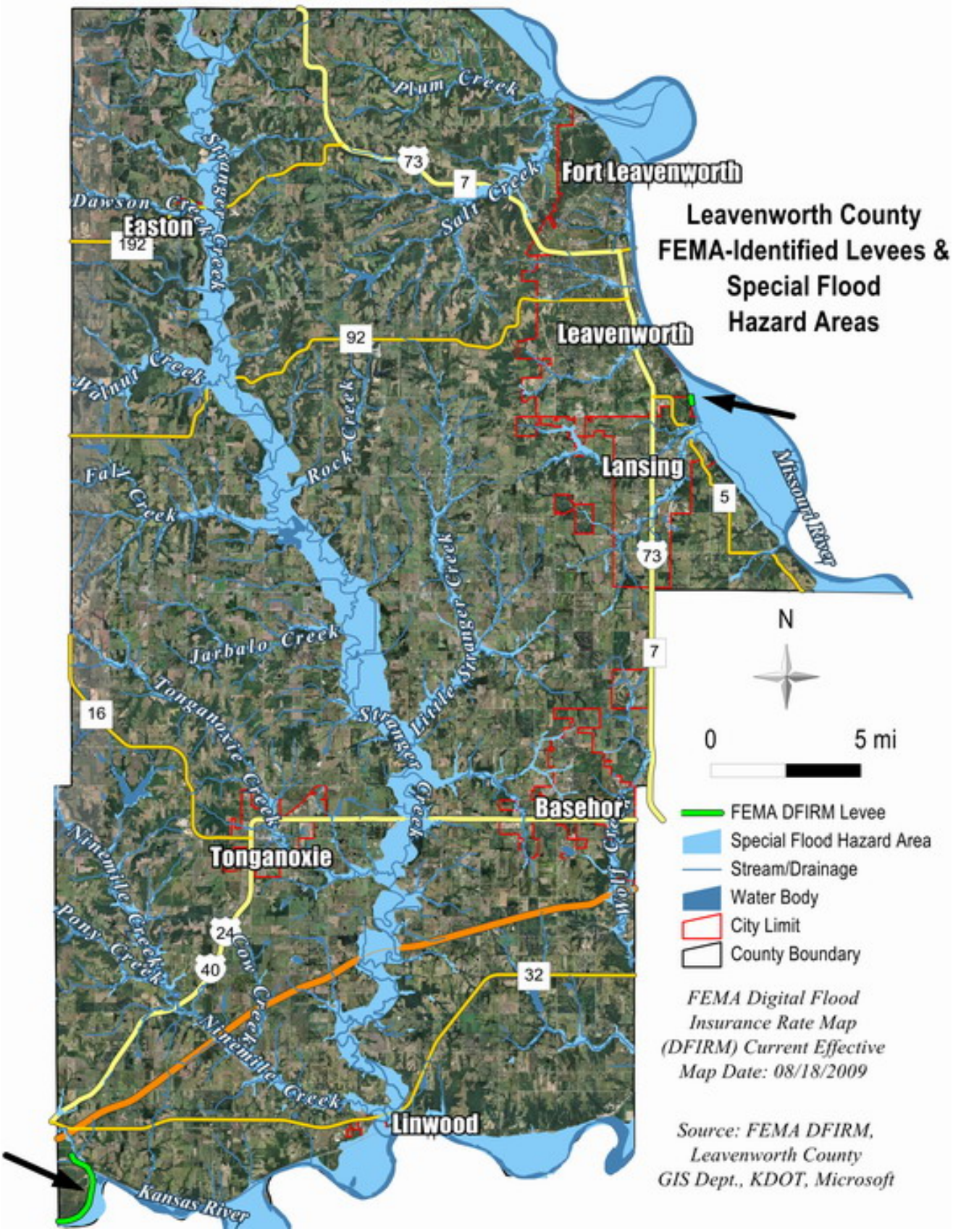


Smith Lake Dam & Merrit Lake Dam, owned by the US Army

Wagner Dam, owned by Ronald Foster

Leavenworth Lake Dam, owned by Kansas Dept. of Wildlife & Parks




Leavenworth County
FEMA-Identified Levees &
Special Flood
Hazard Areas
Fort Leavenworth
Leavenworth
Lansing
Easton
Basehor
Tonganoxie
Linwood
Plum Creek
Salt Creek
Stranger Creek
Dawson Creek
Walnut Creek
Rock Creek
Fall Creek
Little Stranger Creek
Jarbalo Creek
Tonganoxie Creek
Ninemile Creek
Pony Creek
Cow Creek
Wolf Cre
Missouri River
Kansas River
73
7
192
92
5
16
24
40
32
N
0
5 mi
FEMA DFIRM Levee
Special Flood Hazard Area
Stream/Drainage
Water Body
City Limit
County Boundary
FEMA Digital Flood
Insurance Rate Map
(DFIRM) Current Effective
Map Date: 08/18/2009
Source: FEMA DFIRM,
Leavenworth County
GIS Dept., KDOT, Microsoft

### 4.5.3 Vulnerability Estimation by Hazard

E-Fm utilized geographic distribution of natural hazards to develop vulnerability estimates, as recommended by FEMA, for hazards of planning significance. This generally involves assessment of the event location along with the extent and frequency of damage incurred over time. Natural hazards identified as multijurisdictional are those hazards that impact the entire geographical area of the county in a generally random and unpredictable manner. These hazards can include, but are not limited to, two major classes of events: thunderstorms (tornado, lightning, hail, high/straightline wind, etc.), and winter storms (blizzard, ice, sleet, heavy snow, extreme windchill, etc).

Natural hazards identified by FEMA, that are considered local hazards for vulnerability assessment, include: flood, wildfire, and dam/levee failure. These hazards generally create localized damage exposure so vulnerability is treated as a separate geographical planning area for these hazards.

With limited objective flood related data on structures and populations in flood hazard areas and limited data on the appraised and assessed values of real property by land use in the overall multijurisdictional areas of Leavenworth County, estimates of damage inflicted by various types of natural hazards will be offered in a tabular format.

The principal resource in developing loss estimates for the county or municipality was provided by the National Climatic Data Center (NCDC), and best available information relating to populations and the value of real, commercial, and personal property, by jurisdiction, as obtained from various state and county sources. The purpose of this information is to show the overall population numbers and properties values that would be subject to natural hazards in the jurisdictions of Leavenworth County. Areawide natural hazards such as tornados or drought would cause extensive damage because of the number of buildings/parcels in the various jurisdictions of the region.

The qualitative approach used a two step process. The first step analyzed Severity Table 4.2 (2). NCDC provides five categories for severity of damage for deaths, personal injury, property damage, and crop damage. As an example, property damage reported in the database ranges from less than $10,000 to greater than $100,000,000 per event. The consultant recommended the following for consideration:

- A value of 5 in the Severity table be considered as complete destruction (> $100,000,000);
- Values of 0.5, 1 and 2 be considered as 1% damage (1,000,000/100,000,000 = 1% in a worst case scenario)
- Value of 3 be considered as greater than 1% and up to 10% damage (10,000,000/100,000,000 = 10% in a worst case scenario)
- Value of 4 be considered as greater than 10% and up to 50% damage (50,000,000/100,000,000 = 50% in a worst case scenario)

The MPC accepted this scale based on the fact that it is documented data provided by NCDC records.

Step 2 required each jurisdiction to agree on a final damage percentage considering local observations, total values in Table 4.5.1 (1), and specific jurisdiction values provided by the Appraisers office and listed in the vulnerability tables in Section 4. After this consideration, the damage percentage was assigned and used for calculations. If, by consensus, the jurisdiction chose a percentage outside the proposed ranges, then an explanation is provided, such as for flood and tornado.

Wildfire related data to structures, crops, and people were provided by the Kansas Fire Marshal's Office. Data for dam/levee was provided by the Kansas Department of Agriculture (KDA) - Division of Water Structures, and consists of dam/levee inventories and dam classifications developed by the KDA. The hazards identified as high and moderate were assessed utilizing available quantatative analysis and/or loss estimation. Hazards that were researched but provided little data for evaluation were analyzed from a qualitative perspective.

# Flood

Floods are generally a result of slow-moving thunderstorms that deposit large volumes of water over an extended period of time. Heavy thunderstorm/rain may result in localized areas of flash flooding. This hazard is addressed separately by geographical area where data is provided by the jurisdiction.

National Flood Insurance Program (NFIP)

The decision on whether to join the NFIP is very important for a jurisdiction (community). There is no Federal law that requires a jurisdiction to join the program, and participation is voluntary. A benefit of participation is that the citizens are provided the opportunity to purchase flood insurance to protect themselves against flood losses. Another consideration is that a jurisdiction that has been identified by FEMA as being flood-prone and has not joined the NFIP within one year of being notified of being mapped as flood-prone will be sanctioned.

Jurisdictions that regulate development in floodplains are able to participate in the National Flood Insurance Program (NFIP). To participate in the NFIP the jurisdicion must adopt and enforce floodplain management regulations that meet or exceed the minimum requirements of the program.

The jurisdiction must submit an application package that includes the following:

- The jurisdiction must make an Application for Participation in the NFIP (FEMA Form 81-64);
- The jurisdiction must adopt a Resolution of Intent, which indicates an explicit desire to participate in the NFIP and a committment to recognize flood hazards and carry out the objectives of the program;
- The jurisdiction must adopt and submit Floodplain Management Regulations that exceed the minimum flood plain management requirements of the NFIP (Title 44 of the Code of Federal Regulations (44 CFR) section 60.3);
- The jurisdiction's floodplain management regulations must be legally enforceable.

Leavenworth County (unincorporated) and the cities of Basehor, Easton, Lansing, Leavenworth, Linwood, and Tonganoxie are committed to continued participation and compliance with the National Flood Insurance Program (NFIP). Specific Actions that were identified in support of the NFIP are provided in Section 5.2 - Mitigation Actions.

Leavenworth County (unincorporated) adopted floodplain management regulations in 2004. The resolution applies to all areas designated as Zones A, AE, AO, and AH on the Index Map dated September 16, 2004, of the Flood Insurance Rate Map (FIRM), or the Index Map dated September 16, 2004, of the Flood Hazard Boundary Map (FHBM) as amended, and any future revisions thereto. No development shall be permitted, except through the issuance of a floodplain development permit through the County Commission. The Floodplain Administer is responsible for review of all applications to assure that sites are reasonably safe from flooding, and that the floodplain development permit requirements of the resolution have been satisfied before presentation to the Commission for final approval. Further floodplain identification and mapping may be required in the future to update flood maps to determine base flood elevations in the county.

Community Rating System Activities (CRS)

Jurisdictions that regulate development in floodplains are able to participate in the National Flood Insurance Program (NFIP). In return, the NFIP makes federally backed flood insurance policies available for properties in the jurisdiction. The Community Rating System (CRS) was implemented in 1990 as a program for recognizing and encouraging jurisdiction floodplain management activities that exceed the minimum NFIP standards. There are ten CRS classes. Class 1 requires the most credit points and earns the largest premium reduction, while Class 10 receives no premium reduction. It is a long process to become a participating CRS community, taking almost one year from application to acceptance. New CRS communities are admitted only on October 1 and May 1 of each year.

Leavenworth County (unincorporated) and the incorporated cities do not currently participate in the CRS program.

### Repetitive Loss Inventory

The Kansas Department of Emergency Management (KDEM), Mitigation Planning Division, was contacted regarding “repetitive loss properties” that may exist in Leavenworth County. KDEM maintains records obtained from the Federal Emergency Management Agency (FEMA), Region VII, on repetitive loss properties in the State of Kansas. Results of this search are provided in the Table below.

Although there are separate definitions for what constitutes a repetitive loss property among various programs, FEMA generally considers it to be “any property, which the National Flood Insurance Program has paid two or more flood claims of $1,000 or more in any, given 10-year period since 1978.”

## FLOOD: REPETITIVE LOSS PROPERTIES

FLOOD: REPETITIVE LOSS PROPERTIES

| Address | City | Occupancy (type) | Building Value | # Loss Claims | Mitigated? |
|---|---|---|---|---|---|
| RILEY AND ASHBY STS | EASTON | 2-4 FAMILY | $39,000 | 2 | NO |
| DAWSON ST | EASTON | SINGLE FMLY | $27,370 | 2 | NO/SRL |
| DAWSON ST | EASTON | SINGLE FMLY | $62,465 | 2 | NO |
| GENERAL DELIVERY | EASTON | SINGLE FMLY | $181,440 | 2 | NO |
| GARDNER ADD | EASTON | SINGLE FMLY | $34,000 | 2 | NO |
| NOT PROVIDED | EASTON | SINGLE FMLY | $19,200 | 2 | NO |
| BROAD ST | EASTON | SINGLE FMLY | $126,730 | 2 | NO |
| RR 1 | EASTON | NON RESIDNT | $52,500 | 2 | NO |
| S 1ST ST | EASTON | SINGLE FMLY | $88,000 | 2 | NO |
| A F VILAS ST | LEAVENWORTH | OTHER RESID | $550,653 | 2 | NO |
| S 7TH ST | LEAVENWORTH | NON RESIDNT | $253,104 | 2 | NO |
| E 1ST | TONGANOXIE | SINGLE FMLY | $40,000 | 2 | NO |
| N ASBY | EASTON | SINGLE FMLY | $52,100 | 2 | YES |
| NE 1/4-19-8S 2E | EASTON | OTHER RESID | $0 | 2 | Yes |
| SANTA FE TRL | LEAVENWORTH | SINGLE FMLY | $37,440 | 2 | Yes |
| CHEROKEE ST | LEAVENWORTH | 2-4 FAMILY | $399,228 | 3 | NO |
| TO THE CITY OF EASTON | EASTON | SINGLE FMLY | $26,000 | 3 | NO |
| CITY OF EASTON | EASTON | SINGLE FMLY | $30,000 | 3 | NO |
| BLK 1 | EASTON | SINGLE FMLY | $20,000 | 3 | NO |
| PO BOX | EASTON | OTHER RESID | $1,627,068 | 3 | NO |
| ON HW 192 AT E END OF RILEY ST | EASTON | NON RESIDNT | $58,700 | 4 | NO |
| GARDNER ADD | EASTON | SINGLE FMLY | $23,700 | 6 | NO |

There were no repetitive loss properties reported in the unincorporated areas of Leavenworth County.

There are 22 repetitive loss properties identified in incorporated areas of Leavenworth County, three of which have been mitigated. Two properties were located in Easton and one property was located in the

City of Leavenworth. Reportedly, the structures on the properties have been demolished, with the areas returned to green.

In addition to the identified repetitive loss properties, FEMA has worked with local property owners to acquire seven flood-prone homes which were not identified as repetitive loss properties as they were not insured in the NFIP. Reference Section 3.10.2 Legal and Regulatory Capability - "Acquisition" for information on other properties mitigated in Leavenworth County.

Flood inundation areas for Leavenworth County (unincorporated) and participating communities were determined by use of FEMA boundary maps which were geo-coded using Manifold.Net, a GIS application. The GIS application calculates the affected percentage of areas which is used to determine the overall impact by the MPC. This data was then applied to determine the potential flash flood damage based on a 100-year flood event, which would be less than one foot in depth, with an estimated damage of 10%. The overall value of buildings and contents for community assets identified in the tables are estimated from appraised values supplied by the County Appraiser. The following table represents the potential exposure loss for each community.

# SUMMARY OF POTENTIAL HAZARD-RELATED EXPOSURE/LOSS IN JURISDICTIONS

| FLOOD: SUMMARY OF POTENTIAL HAZARD-RELATED EXPOSURE/LOSS IN JURISDICTIONS | | | | | |
|---|---|---|---|---|---|
| **RESIDENTIAL** | | | | | |
| Jurisdiction | Exposed Population | Exposed # of Buildings | Exposed Valuation $ | Estimated Damage as % | Potential Dollar Exposure / Loss |
| Leavenworth (UnInc.) | 2,542 | 708 | $57,408,818 | 10.00% | $5,740,882 |
| Lansing | 2,300 | 840 | $100,305,100 | 10.00% | $10,030,510 |
| Leavenworth | 2,125 | 708 | $57,408,818 | 10.00% | $5,740,882 |
| Basehor | 336 | 144 | $19,112,911 | 10.00% | $1,911,291 |
| Tonganoxie | 245 | 177 | $16,887,230 | 10.00% | $1,688,723 |
| Linwood | 215 | 125 | $5,304,440 | 10.00% | $530,444 |
| Easton | 224 | 95 | $2,318,961 | 10.00% | $231,896 |
| **COMMERCIAL** | | | | | |
| Jurisdiction | Exposed Population | Exposed # of Buildings | Exposed Valuation $ | Estimated Damage as % | Potential Dollar Exposure / Loss |
| Leavenworth (UnInc.) | 1,288 | 234 | $30,442,448 | 10.00% | $3,044,245 |
| Lansing | 850 | 39 | $7,295,960 | 10.00% | $729,596 |
| Leavenworth | 783 | 48 | $9,185,601 | 10.00% | $918,560 |
| Basehor | 336 | 4 | $1,153,190 | 10.00% | $115,319 |
| Tonganoxie | 120 | 16 | $1,494,408 | 10.00% | $149,441 |
| Linwood | 99 | 6 | $475,068 | 10.00% | $47,507 |
| Easton | 80 | 9 | $225,457 | 10.00% | $22,546 |
| **CRITICAL FACILITIES** | | | | | |
| Jurisdiction | Exposed Population | Exposed # of Buildings | Exposed Valuation $ | Estimated Damage as % | Potential Dollar Exposure / Loss |
| Leavenworth (UnInc.) | 1,060 | 76 | $387,255,690 | 10.00% | $38,725,569 |
| Lansing | 14 | 4 | $6,000,000 | 10.00% | $600,000 |
| Leavenworth | 18 | 14 | $44,105,502 | 10.00% | $4,410,550 |
| Basehor | 3 | 2 | $478,168 | 10.00% | $47,817 |
| Tonganoxie | 7 | 1 | $148,637 | 10.00% | $14,864 |
| Linwood | 1 | 7 | $357,500 | 10.00% | $35,750 |
| Easton | 1 | 7 | $414,160 | 10.00% | $41,416 |

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## SUMMARY OF POTENTIAL HAZARD-RELATED EXPOSURE/LOSS IN SCHOOL JURISDICTIONS

| FLOOD: SUMMARY OF POTENTIAL HAZARD-RELATED EXPOSURE/LOSS IN SCHOOL JURISDICTIONS | | | | | |
|---|---|---|---|---|---|
| **SCHOOL(S)** | | | | | |
| Jurisdiction | Exposed Population | Exposed # of Buildings | Exposed Valuation $ | Estimated Damage as % | Potential Dollar Exposure / Loss |
| USD 458 | 470 | 2 | $14,222,908 | 10.00% | $1,422,291 |
| **SUPPORTING FACILITIES** | | | | | |
| Jurisdiction | Exposed Population | Exposed # of Buildings | Exposed Valuation $ | Extimated Damage as % | Potential Dollar Exposure / Loss |
| USD 458 | 0 | 0 | $0 | 0.00% | $0 |

### Leavenworth County (Unincorporated)

The area of Leavenworth County that has the most risk of flooding is along the Kansas and Missouri Rivers and their tributaries. Local climatic conditions in tandem with relatively limited usage of groundwater aquifers contribute to the presence of surface water and continuous streamflow in Leavenworth County. Abundant annual rainfall (relative to other Kansas counties), two major rivers forming the northeastern and southern borders, an extensive drainage basin spanning the entire county from north to south, and the presence of continuous hills and valleys as the dominating topographic feature throughout the county create an environment conducive to flash flooding. This observation is further substantiated by numerous flood warning signs posted in low areas across the county.

Numerous other creeks and tributaries criss-cross the county. Maps that display the location and extent of flood hazard areas are provided in Section 4.5.2 - Vulnerability Maps.

### City of Basehor

A review of the Digital Flood Insurance Rate Map (DFIRM), dated August 18, 2009, reveals that portions of both Hog Creek and Wolf Creek are located within the city limits of Basehor. Special Flood Hazard Areas (SFHAs) are located along and in close proximity to both creeks, and encompass agricultural and developed areas. Maps that display the location and extent of flood hazard areas are provided in Section 4.5.2 - Vulnerability Maps. Specific Actions that were identified in support of the NFIP are provided in Section 5.3 Mitigation Actions.

### City of Easton

A review of the Digital Flood Insurance Rate Map (DFIRM), dated August 18, 2009, reveals that approximately half of the City of Easton is located within Special Flood Hazard Areas (SFHAs), due to the presence of Stranger Creek to the east and Dawson Creek to the west. The SFHAs encompass both agricultural and developed areas. Maps that display the location and extent of flood hazard areas are provided in Section 4.5.2 - Vulnerability Maps.

### City of Lansing

A review of the Digital Flood Insurance Rate Map (DFIRM), dated August 18, 2009, reveals that portions of both Seven Mile Creek and Nine Mile Creek are located within the city limits of Lansing. Special Flood Hazard Areas (SFHAs) are located along and in close proximity to both creeks, and encompass agricultural and developed areas. In addition, an apparent agricultural area on the eastern edge of Lansing is located in a SFHA. Maps that display the location and extent of flood hazard areas are provided in Section 4.5.2 - Vulnerability Maps. Specific Actions that were identified in support of the NFIP are

provided in Section 5.3 Mitigation Actions.

### City of Leavenworth

A review of the Digital Flood Insurance Rate Map (DFIRM), dated August 18, 2009, reveals that portions of both Five Mile Creek and Three Mile Creek are located within the city limits of Leavenworth. Special Flood Hazard Areas (SFHAs) are located along and in close proximity to both creeks, and encompass agricultural and developed areas. In addition, an area along the eastern edge of Leavenworth is located in a SFHA, adjacent to the Missouri River. Maps that display the location and extent of flood hazard areas are provided in Section 4.5.2 - Vulnerability Maps. Specific Actions that were identified in support of the NFIP are provided in Section 5.3 Mitigation Actions.

### City of Linwood

A review of the Digital Flood Insurance Rate Map (DFIRM), dated August 18, 2009, reveals that the City of Linwood is located in close proximity to the Kansas River, and portions of both Nine Mile Creek and Stranger Creek are located within the city limits of Linwood. Special Flood Hazard Areas (SFHAs) are located along and in close proximity to both creeks, encompassing agricultural and developed areas. In addition, SFHAs in association with the Kansas River are apparent along the southern portions of Linwood. Maps that display the location and extent of flood hazard areas are provided in Section 4.5.2 - Vulnerability Maps. Specific Actions that were identified in support of the NFIP are provided in Section 5.3 Mitigation Actions.

### City of Tonganoxie

A review of the Digital Flood Insurance Rate Map (DFIRM), dated August 18, 2009, reveals that the Tonganoxie Creek flows northwest to southeast through the City of Tonganoxie. Special Flood Hazard Areas (SFHAs) are located along and in close proximity to the creek, encompassing both agricultural and developed areas. Maps that display the location and extent of flood hazard areas are provided in Section 4.5.2 - Vulnerability Maps. Specific Actions that were identified in support of the NFIP are provided in Section 5.3 Mitigation Actions.

### Unified School District 458

Unified School District #458 serves the residents of Leavenworth County and has schools located in the communities of Basehor and Linwood. Both of these cities currently participate in the NFIP, making flood insurance available to the school district. At this time, the school district did not identify a need for flood insurance for their facilities, but does support continued compliance with NFIP procedures. Specific Actions that were identified in support of the NFIP are provided in Section 5.2.2 - Mitigation Actions.

### Unified School Districts 464 and 469

Unified School District #464 serves the residents of Leavenworth County and has schools located in the City of Tonganoxie. The City of Tonganoxie is a participant in the NFIP, making flood insurance available to the school district. The USD reported that a portion of the property containing the District Stadium and Fieldhouse located at the Tonganoxie High School was located in a floodplain. At this time, the school district did not identify a need for flood insurance for this area or their other facilities, but does support continued compliance with NFIP procedures.

Unified School District #469 serves the residents of Leavenworth County and has schools located in the City of Lansing. The City of Lansing is a participant in the NFIP, making flood insurance available to the school district. The USD reported that a portion of USD property, located in close proximity to Seven Mile Creek, was located in a floodplain. At this time, the school district did not identify a need for flood insurance for this area or their other property or facilities, but does support continued compliance with NFIP procedures.

### Unified School Districts 449 and 453 and the University of St. Mary

USDs 449 and 453 and the University of St. Mary reported that there were no school facilities within a floodplain, and did not identify a need for flood insurance for their facilities.

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## Tornado

The damage from a tornado is a result of high wind velocity and wind-blown debris. The potential damage resulting from a tornado is directly correlated to the strength of the particular tornado and is qualified utilizing the Enhanced Fujita Scale. The EF Scale assigns numerical values based on wind speeds and categorizes tornadoes from EF0 through EF5.

The entire county is equally susceptible to damage from tornadoes. Although urbanized areas face the greatest vulnerability because of their concentration of buildings, population, and lifeline utilities, the economic impact from loss of crops, livestock, and storage facilities in the rural parts of the county can have permanent or long-lasting impact on the communities in Leavenworth County. Additionally, the range of damage is largely dependent upon numerous storm factors. The jurisdictions utilized qualitative data to estimate the probable percent damage based on the overall average severity magnitude rating for Tornado identified in this plan. In many cases, due to the small nature of the towns in Leavenworth County, a Tornado could virtually wipe out the entire community (90% to 100%). The City of Basehor estimated that the damage to the city from a major tornado event would be 97%.

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## SUMMARY OF POTENTIAL HAZARD-RELATED EXPOSURE/LOSS IN JURISDICTIONS

| TORNADO: SUMMARY OF POTENTIAL HAZARD-RELATED EXPOSURE/LOSS IN JURISDICTIONS | | | | | |
|---|---|---|---|---|---|
| **RESIDENTIAL** | | | | | |
| Jurisdiction | Exposed Population | Exposed # of Buildings | Exposed Valuation $ | Estimated Damage as % | Potential Dollar Exposure / Loss |
| Leavenworth (UnInc.) | 19,552 | 27,045 | $2,478,970,122 | 20.00% | $495,794,024 |
| Lansing | 9,199 | 3,360 | $401,220,400 | 20.00% | $80,244,080 |
| Leavenworth | 35,420 | 11,801 | $956,813,642 | 20.00% | $191,362,728 |
| Basehor | 4,200 | 1,909 | $239,003,969 | 60.00% | $143,402,381 |
| Tonganoxie | 2,728 | 1,965 | $187,635,896 | 60.00% | $112,581,538 |
| Linwood | 391 | 228 | $9,644,437 | 90.00% | $8,679,993 |
| Easton | 362 | 154 | $3,740,260 | 90.00% | $3,366,234 |
| **COMMERCIAL** | | | | | |
| Jurisdiction | Exposed Population | Exposed # of Buildings | Exposed Valuation $ | Estimated Damage as % | Potential Dollar Exposure / Loss |
| Leavenworth (UnInc.) | 9,910 | 1,800 | $234,172,680 | 20.00% | $46,834,536 |
| Lansing | 3,400 | 158 | $29,183,840 | 20.00% | $5,836,768 |
| Leavenworth | 13,044 | 803 | $153,093,350 | 20.00% | $30,618,670 |
| Basehor | 1,178 | 69 | $14,414,870 | 60.00% | $8,648,922 |
| Tonganoxie | 1,337 | 175 | $16,604,530 | 60.00% | $9,962,718 |
| Linwood | 180 | 11 | $863,760 | 90.00% | $777,384 |
| Easton | 129 | 14 | $363,640 | 90.00% | $327,276 |
| **CRITICAL FACILITIES** | | | | | |
| Jurisdiction | Exposed Population | Exposed # of Buildings | Exposed Valuation $ | Estimated Damage as % | Potential Dollar Exposure / Loss |
| Leavenworth (UnInc.) | 8,154 | 589 | $2,978,889,920 | 20.00% | $595,777,984 |
| Lansing | 55 | 15 | $24,000,000 | 20.00% | $4,800,000 |
| Leavenworth | 304 | 241 | $735,091,700 | 20.00% | $147,018,340 |
| Basehor | 38 | 23 | $5,977,106 | 60.00% | $3,586,264 |
| Tonganoxie | 80 | 9 | $1,651,519 | 60.00% | $990,911 |
| Linwood | 2 | 14 | $650,000 | 90.00% | $585,000 |
| Easton | 1 | 11 | $668,000 | 90.00% | $601,200 |

The schools have identified a need for shelters for protection from tornadoes, high winds, and other consequences of these events. Based on a major tornado which would devastate the campus the estimated damage would be 90%.

## SUMMARY OF POTENTIAL HAZARD-RELATED EXPOSURE/LOSS IN SCHOOL JURISDICTIONS

| TORNADO: SUMMARY OF POTENTIAL HAZARD-RELATED EXPOSURE/LOSS IN SCHOOL JURISDICTIONS | | | | | |
|---|---|---|---|---|---|
| **SCHOOL(S)** | | | | | |
| Jurisdiction | Exposed Population | Exposed # of Buildings | Exposed Valuation $ | Estimated Damage as % | Potential Dollar Exposure / Loss |
| University of St. Mary | 480 | 5 | $53,991,000 | 90.00% | $48,591,900 |
| USD 449 | 756 | 4 | $24,243,862 | 90.00% | $21,819,476 |
| USD 453 | 4,699 | 11 | $119,196,647 | 90.00% | $107,276,982 |
| USD 458 | 2,933 | 8 | $56,891,632 | 90.00% | $51,202,469 |
| USD 469 | 2,900 | 10 | $64,582,400 | 90.00% | $58,124,160 |
| USD 464 | 2,100 | 4 | $55,000,000 | 90.00% | $49,500,000 |
| **SUPPORTING FACILITIES** | | | | | |
| Jurisdiction | Exposed Population | Exposed # of Buildings | Exposed Valuation $ | Extimated Damage as % | Potential Dollar Exposure / Loss |
| University of St. Mary | 143 | 5 | $44,686,000 | 90.00% | $40,217,400 |
| USD 449 | 35 | 5 | $423,000 | 90.00% | $380,700 |
| USD 453 | 40 | 4 | $4,084,460 | 90.00% | $3,676,014 |
| USD 458 | 40 | 4 | $366,000 | 90.00% | $329,400 |
| USD 469 | 200 | 1 | $500,000 | 90.00% | $450,000 |
| USD 464 | 50 | 2 | $750,000 | 90.00% | $675,000 |

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# Dam / Levee

## Dams

There are 79,500 dams in the United States, according to the 2005 update to the National Inventory of Dams. Approximately one third of these pose a "high" or "significant" hazard to life and property if failure occurs.

A dam is a barrier across flowing water that obstructs, directs or slows down the flow, often creating a reservoir, lake or impoundments. Most dams have a section called a spillway or weir over which, or through which, water flows, either intermittently or continuously, and many have hydroelectric power generation systems installed.

Dams are considered "installations containing dangerous forces" under International Humanitarian Law due to the massive impact of a possible destruction on the civilian population and the environment. Dam failures are comparatively rare, but can cause immense damage and loss of life when they arise.

National statistics show that overtopping due to inadequate spillway design, debris blockage of spillways, or settlement of the dam crest account for 34% of all dam failures. Foundation defects, including settlement and slope instability, account for 30% of all failures. Piping and seepage cause 20% of national dam failures. This includes internal erosion caused by seepage, seepage and erosion along hydraulic structures, leakage through animal burrows, and cracks in the dam. The remaining 16% of failures are caused by other means. Dam failure can occur with little warning. Intense storms may produce a flood in a few hours or even minutes for upstream locations. Flash floods occur within six hours of the beginning of heavy rainfall, and dam failure may occur within hours of the first signs of breaching. Other failures can take much longer to occur, from days to weeks, as a result of debris jams or the accumulation of melting snow.

In Kansas, Federal Reservoirs are inspected, maintained and managed by either the U.S. Corps of engineers or the Bureau of Reclamation. Emergency Action Plans (EAPs), including inundation maps, are designated as For Official Use Only (FOUO), and are available only to local governments downstream for use in an emergency. The Local Emergency Operations Plan (LEOP) should include inundation maps in the event of a flooding event, or an emergency at the facility.

Dam inundation hazards are addressed separately by geographical area where data is available to the county.

Federal Reservoirs Inside and Outside of Leavenworth County

There were no Federal Reservoirs identified inside Leavenworth County that could have a negative impact on the county in the event of a breach, overtopping, or failure of the dam.

The Department of Water Resources identified four Federal Reservoirs outside Leavenworth County that could potentially have a negative impact on the county in the event of a breach, overtopping, or failure of the dam. The dams are identified as the Tuttle Creek Dam in Riley County (Big Blue River River); the Milford Lake Dam in Geary County (Republican River); the Perry Lake Dam in Douglas County (Delaware River); and the Clinton Lake Dam in Douglas County (Wakarusa River).

Leavenworth County communities located in the Kansas River Basin, including Fall Leaf, Linwood, and Coldspur could potentially be impacted by floodwaters from Tuttle Creek Reservoir, located approximately six miles north of the city of Manhattan, Kansas. The Corp of Engineers has identified a “hot spot” along the middle part of the Humboldt Fault with a potential for generating an earthquake with a maximum magnitude (moment magnitude) of 6.6, at a minimum epicentral distance of 12.5 miles from the dam site. A potential breach in the dam from a large magnitude seismic event would flood residential, commercial, and agricultural areas downstream, and would have many other adverse social and economic consequences. The estimated warning time for Leavenworth County residents is approximately 33 hours.

Leavenworth County communities located in the Kansas River Basin, including Fall Leaf, Linwood, and Coldspur could also be impacted by floodwaters from Clinton Lake in the event of a catastrophic event. The Clinton Dam Contingency Plan (now called the Emergency Action Plan for Clinton Dam) is reportedly on file with the Leavenworth County LEOP. The Emergency Action Plan was last updated July 2002 by the Army Corps of Engineers. The hazard analysis provides an overview of emergency procedures, resources, communication procedures, etc.

Similar information, planning, emergency procedures, maps, etc. are provided for Milford Lake, which is located approximately five miles northwest of Junction City, Kansas. Review of the Emergency Action Plan indicates floodwaters from Milford Lake would reach Leavenworth County in approximately 35 hours, potentially impacting the communities of Fall Leaf, Linwood, and Coldspur.

An Emergency Action Plan for Perry Lake was not available for review, although it is estimated that flooding from the Perry Dam would impact Leavenworth County areas downstream along the Kansas River basin including the communities of Fall Leaf, Linwood, and Coldspur.

It was reported that the inundation maps for these Federal Reservoirs are classified under the Patriot Act and were not available for review or inclusion in this report. The Emergency Management department should have access to these plans in the event of an emergency.

The Department of Water Resources identified seven (7) high-hazard dams in Leavenworth County that could impact the county in the event of breach or dam failure. These seven dams include:

Bing's Lake Dam (State ID #DLV-0026), owned by Falcon Lakes Homes Association Incorporated, constructed in 2001.

Lake Hope Dam (State ID #DLV-0224), owned by Falcon Lakes Homes Association Incorporated, constructed in 2001.

Runnebaum Dam (State ID #DLV-0115), owned by William R. Runnebaum, constructed in 1977.

Smith Lake Dam (State ID #DLV-0114), owned by the US Army, constructed in 1942.

Merritt Lake Dam (State ID #DLV-0113), owned by the US Army, constructed in 1942.

Wagner Dam (State ID #DLV-0057), owned by Ronald Foster, constructed in 1969.

Leavenworth State Lake Dam (State ID #DLV-0124), owned by Kansas Dept. of Wildlife & Parks, constructed in 1994.

Dam owners are required to develop and submit an Emergency Action Plan (EAP) for each of their dams that include inundation maps for emergency response.

The Department of Agriculture, Division of Water Resources is conducting a HMGP Project for three (3) of the High Hazard Dams in Leavenworth County:

Bing's Lake Dam (State ID #DLV-0026)

Lake Hope Dam (State ID #DLV-0224)

Leavenworth State Lake Dam (State ID #DLV-0124)

The project will provide necessary funds to contract for the development of dam breach inundation maps to assist local communities in mitigating future losses to life and property. Maps will also be used for determining dam classification, zoning down stream, and development of emergency action plans.

During the preparation of this Plan, there were no EAPs available for review through the Department of Agriculture - Division of Water Resources or through the Leavenworth County Emergency Management Office for any of the seven (7) High Hazard Dams identified.

An Action has been included to obtain this data for future updates to this Plan.

Dam classifications provided by the Department of Agriculture, Division of Water Resources are not an indicator of “worthiness”, but do present a legitimate risk to the county. Consequently, these dams are included in the county mitigation planning process.

### Levees

A levee is a man-made structure; usually earthen embankments designed and constructed in accordance with sound engineering practices to contain, control, or divert the flow of water so as to provide protection from temporary flooding. A levee is generally built parallel to a body of water (most often a river) in order to protect lives and property behind it from some level of flooding.

FEMA is responsible for identifying flood risks in areas behind levees through flood analysis and flood hazard mapping projects, including updating the nation’s hazard maps through an effort called Flood Map Modernization (Map Mod). In addition, FEMA also provides criteria to define which protect against the 1-percent-annual-chance flood. FEMA does not examine or analyze structures to determine their performance in a given flood event. The levee owner must provide documentation to show that a levee meets current design, operations, and maintenance criteria. FEMA will accredit levees based on a review of these criteria. Levee owners or communities have a responsibility to provide documentation that a levee meets the requirements of Title 44 of the Code of Federal Regulations, Section 65.10, as part of a study/mapping project. Procedure Memorandum 34 (PM 34) allows for the issuance of a deadline to the community for submitting the required documentation. (Source: FEMA)

FEMA – Region VII reported that their MAP Mod modernization program focuses on levees found on existing FEMA Flood Maps (FIRMS) prior to update. FEMA is initiating a process to notify owners, schedule meetings, and provide guidance to owners. The intent is to assist meeting Federal requirements and accredit identified levees.

The State of Kansas has four statutes that regulate the design and construction of levees. The Statutes include: 12-635 Flood Protection; Eminent Domain; 14-434 Power to Regulate; 19-3301 Flood Control; Counties, and 24-816 Within 1st Class Cities. These statutes guide an owner or community through the process of developing levees within the county, and mandate requirements for reporting and maintenance of the levee(s).

Levee failure could be attributed to many factors including engineering failure, inadequate height, erosion, soil quality, ineffective levee board system, seepage, and other types of hydrologic issues that could disrupt the integrity of a levee. Developing a sound maintenance plan along with monitoring water flow and construction conditions to certify levees are the best approach to preventing future failure. Ordinances which monitor and control construction and construction excavations in the vicinity of a levee can also prevent unforseen damage to systems.

Levee hazards are addressed separately by geographical area where data is available to the county.

In Leavenworth County there are 48 identified levees included in the State of Kansas, Department of Agriculture, Division of Water Resources database. Leavenworth County was identified as the owner of four (4) of the levees, and one levee was identified as being owned by an individual. The remaining levees were listed as "Unknown".

Of the four levee systems identified as belonging to Leavenworth County, the Leavenworth County Emergency Management Coordinator reported that he was unaware of any county-owned levees, although he identified one levee system in the extreme southeast corner of unincorporated Leavenworth County that the county had sold to Douglas County. This levee system was identified on the August 2009 D-FIRM as the "Lawrence Unit".

The City of Lansing identified a US Army Corps of Engineers-owned levee system located along the

northeastern edge of the Lansing city limits. This levee system was the only additional levee system identified on the August 2009 DFIRM.

An Action has been included in this Plan to obtain the necessary ownership and levee status data for these and the other levee systems in the county for inclusion in future updates.

The estimated vulnerability for dam and levee exposure is provided in the table below, and is based on flood inundation areas for Leavenworth County (unincorporated) and the City of Lansing determined by use of FEMA boundary maps which were geo-coded using Manifold.Net, a GIS application. The GIS application calculates the affected percentage of areas which is used to determine the overall impact by the MPC. This data was then applied to determine the potential flood damage based on a 100-year flood event, which would be less than one foot in depth, with an estimated damage of 10%. The overall value of buildings and contents for community assets identified in the tables are estimated from appraised values supplied by the County Appraiser.

## SUMMARY OF POTENTIAL HAZARD-RELATED EXPOSURE/LOSS IN JURISDICTIONS

| DAM/LEVEE: SUMMARY OF POTENTIAL HAZARD-RELATED EXPOSURE/LOSS IN JURISDICTIONS | | | | | |
|---|---|---|---|---|---|
| **RESIDENTIAL** | | | | | |
| Jurisdiction | Exposed Population | Exposed # of Buildings | Exposed Valuation $ | Estimated Damage as % | Potential Dollar Exposure / Loss |
| Leavenworth (UnInc.) | 2,542 | 3,516 | $322,266,116 | 10.00% | $32,226,612 |
| Lansing | 2,300 | 840 | $100,305,100 | 10.00% | $10,030,510 |
| **COMMERCIAL** | | | | | |
| Jurisdiction | Exposed Population | Exposed # of Buildings | Exposed Valuation $ | Estimated Damage as % | Potential Dollar Exposure / Loss |
| Leavenworth (UnInc.) | 1,288 | 234 | $30,442,448 | 10.00% | $3,044,245 |
| Lansing | 850 | 39 | $7,295,960 | 10.00% | $729,596 |
| **CRITICAL FACILITIES** | | | | | |
| Jurisdiction | Exposed Population | Exposed # of Buildings | Exposed Valuation $ | Estimated Damage as % | Potential Dollar Exposure / Loss |
| Leavenworth (UnInc.) | 1,060 | 76 | $387,255,690 | 10.00% | $38,725,569 |
| Lansing | 14 | 4 | $6,000,000 | 10.00% | $600,000 |

## SUMMARY OF POTENTIAL HAZARD-RELATED EXPOSURE/LOSS IN SCHOOL JURISDICTIONS

### Leavenworth County (unincorporated)

Department of Agriculture, Division of Water Resources-identified levees are not geo-located, but rather are located by Section, Township, and Range only. Levees were placed into a GIS produced county background to view general locations. The majority of levees were not found to be within, or close proximity to, any of the jurisdictions. Generally, the levees would be labeled as agricultural levees or levees located along the Missouri River, and don't appear to be providing protection from 100-year flood events. These levees were not identified on existing FEMA FIRM maps, nor were they identified by the MPC as county levees subject to PM 43.

## Excessive Heat

During the summer months, the State of Kansas is frequently affected by severe heat hazards. Persistent domes of high pressure establish themselves, which set up hot and dry conditions. This high pressure prevents other weather features such as cool fronts or rain events from moving into the area and providing necessary relief. Daily high temperatures range into the upper 90’s and low 100’s. When combined with moderate to high relative humidity levels, the heat index moves into dangerous levels, and a heat index of 105 degrees is considered the level where many people begin to experience extreme discomfort or physical distress.

There is no distinct geographic boundary to Excessive Heat. Excessive Heat can occur in every area of the county equally. All populations, buildings, critical facilities, infrastructure and lifelines, and hazardous materials facilities are considered exposed to the excessive summer heat hazard and could potentially be impacted.

For purposes of this hazard mitigation plan, Leavenworth County will assess this hazard's vulnerability on a multijurisdictional planning basis instead of establishing separate geographic planning areas for this type of event. The MPC noted that the greatest exposure to this hazard is on the population of Leavenworth County rather than impacting physical County assets.

### SUMMARY OF POTENTIAL HAZARD-RELATED EXPOSURE/LOSS IN JURISDICTIONS

### SUMMARY OF POTENTIAL HAZARD-RELATED EXPOSURE/LOSS IN SCHOOL JURISDICTIONS

# Hail

Hailstorms can cause extensive property damage affecting both urban and rural landscapes across large areas. Fortunately, most hailstorms produce marble-size or smaller hailstones. These can cause damage to crops, but they normally do not damage buildings or automobiles. Larger hailstones can destroy crops, livestock, and wildlife and can cause extensive damage to buildings, including roofs, windows, and outside walls. Vehicles can be total losses. When hail breaks windows, water damage from accompanying rains can also be significant. A major hailstorm can easily cause damage running into the millions of dollars.

Hail vulnerability is unpredictable and is a multijurisdictional hazard capable of producing extensive damage from the impact of falling objects. Most thunderstorms do not produce hail, and ones that do normally produce only small hailstones not more than one-half inch in diameter. However, hailstones can grow larger than the size of a golf ball before falling to the ground. On September 3, 1970, a thunderstorm in Coffeyville, Kansas produced a hailstone that measured more than 5 inches in diameter and 17 inches around, weighing 1.7 pounds.

Hail is associated with severe thunderstorms. Powerful updrafts produce cumulonimbus clouds that tower tens of thousands of feet above the ground. Air temperature in the upper levels of these clouds may be -50°F or below. Hailstones grow as ice pellets, are lifted by updrafts, and collect supercooled water droplets. As they grow, hailstones become heavier and begin to fall. Sometimes, they are caught by successively stronger updrafts and are circulated through the cloud again and again, growing larger each time the cycle is repeated. Eventually, the updrafts can no longer support the weight of the hailstones. As hailstones fall to the ground, they produce a hailstreak that may be more than a mile wide and a few miles long. A single thunderstorm can produce several hailstreaks (Changnon and Ivens, 1987).

Hailstorms occur every year in Kansas. Fortunately, most of these cause minimal damage. However, storms producing large hail and causing extensive damage are ingrained in the memories of many Kansas residents. While it is not possible to prevent damage, efforts to mitigate the potential effects of hail can help property owners to minimize their losses.

Severe weather watches and warnings often provide ample time to prepare for a hailstorm. When there is a threat of severe weather, property owners should move vehicles and other valuable moveable objects to locations that provide shelter from falling hail. Farmers should move livestock and machinery to sheltered locations. If a hailstorm is approaching, take shelter inside. Close drapes, blinds, and window shades inside your house to reduce the likelihood of shattered glass being blown inside. Then, move to an interior room on the lowest level and stay there during the storm.

The entire Leavenworth County area is equally susceptible to damage from hail in association with severe thunderstorms.

The best protection against financial loss from hail is to purchase insurance. Homeowners and auto insurance should include coverage for hail damage. Farmers should invest in crop insurance to protect against catastrophic loss.

# SUMMARY OF POTENTIAL HAZARD-RELATED EXPOSURE/LOSS IN JURISDICTIONS

| HAIL: SUMMARY OF POTENTIAL HAZARD-RELATED EXPOSURE/LOSS IN JURISDICTIONS | | | | | |
|---|---|---|---|---|---|
| **RESIDENTIAL** | | | | | |
| Jurisdiction | Exposed Population | Exposed # of Buildings | Exposed Valuation $ | Estimated Damage as % | Potential Dollar Exposure / Loss |
| Leavenworth (UnInc.) | 19,552 | 27,045 | $2,478,970,122 | 10.00% | $247,897,012 |
| Lansing | 9,199 | 3,360 | $401,220,400 | 10.00% | $40,122,040 |
| Leavenworth | 35,420 | 11,801 | $956,813,642 | 10.00% | $95,681,364 |
| Basehor | 4,200 | 1,909 | $239,003,969 | 10.00% | $23,900,397 |
| Tonganoxie | 2,728 | 1,965 | $187,635,896 | 10.00% | $18,763,590 |
| Linwood | 391 | 228 | $9,644,437 | 10.00% | $964,444 |
| Easton | 362 | 154 | $3,740,260 | 10.00% | $374,026 |
| **COMMERCIAL** | | | | | |
| Jurisdiction | Exposed Population | Exposed # of Buildings | Exposed Valuation $ | Estimated Damage as % | Potential Dollar Exposure / Loss |
| Leavenworth (UnInc.) | 9,910 | 1,800 | $234,172,680 | 10.00% | $23,417,268 |
| Lansing | 3,400 | 158 | $29,183,840 | 10.00% | $2,918,384 |
| Leavenworth | 13,044 | 803 | $153,093,350 | 10.00% | $15,309,335 |
| Basehor | 1,178 | 69 | $14,414,870 | 10.00% | $1,441,487 |
| Tonganoxie | 1,337 | 175 | $16,604,530 | 10.00% | $1,660,453 |
| Linwood | 180 | 11 | $863,760 | 10.00% | $86,376 |
| Easton | 129 | 14 | $363,640 | 10.00% | $36,364 |
| **CRITICAL FACILITIES** | | | | | |
| Jurisdiction | Exposed Population | Exposed # of Buildings | Exposed Valuation $ | Estimated Damage as % | Potential Dollar Exposure / Loss |
| Leavenworth (UnInc.) | 8,154 | 589 | $2,978,889,920 | 10.00% | $297,888,992 |
| Lansing | 55 | 15 | $24,000,000 | 10.00% | $2,400,000 |
| Leavenworth | 304 | 241 | $735,091,700 | 10.00% | $73,509,170 |
| Basehor | 38 | 23 | $5,977,106 | 10.00% | $597,711 |
| Tonganoxie | 80 | 9 | $1,651,519 | 10.00% | $165,152 |
| Linwood | 2 | 13 | $650,000 | 10.00% | $65,000 |
| Easton | 1 | 11 | $668,000 | 10.00% | $66,800 |

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## SUMMARY OF POTENTIAL HAZARD-RELATED EXPOSURE/LOSS IN SCHOOL JURISDICTIONS

| HAIL: SUMMARY OF POTENTIAL HAZARD-RELATED EXPOSURE/LOSS IN SCHOOL JURISDICTIONS | | | | | |
|---|---|---|---|---|---|
| **SCHOOL(S)** | | | | | |
| Jurisdiction | Exposed Population | Exposed # of Buildings | Exposed Valuation $ | Estimated Damage as % | Potential Dollar Exposure / Loss |
| University of St. Mary | 480 | 5 | $53,991,000 | 10.00% | $5,399,100 |
| USD 449 | 756 | 4 | $24,243,862 | 10.00% | $2,424,386 |
| USD 453 | 4,699 | 11 | $119,196,647 | 10.00% | $11,919,665 |
| USD 458 | 2,933 | 8 | $56,891,632 | 10.00% | $5,689,163 |
| USD 469 | 2,900 | 10 | $64,582,400 | 10.00% | $6,458,240 |
| USD 464 | 2,100 | 4 | $55,000,000 | 10.00% | $5,500,000 |
| **SUPPORTING FACILITIES** | | | | | |
| Jurisdiction | Exposed Population | Exposed # of Buildings | Exposed Valuation $ | Extimated Damage as % | Potential Dollar Exposure / Loss |
| University of St. Mary | 143 | 5 | $44,686,000 | 10.00% | $4,468,600 |
| USD 449 | 35 | 5 | $423,000 | 10.00% | $42,300 |
| USD 453 | 40 | 4 | $4,084,460 | 10.00% | $408,446 |
| USD 458 | 40 | 4 | $366,000 | 10.00% | $36,600 |
| USD 469 | 200 | 1 | $500,000 | 10.00% | $50,000 |
| USD 464 | 50 | 2 | $750,000 | 10.00% | $75,000 |

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## Terrorism / AT / CD

Planning for this category of hazard is similar to natural hazards in that these types of hazards can occur randomly, or as a result of a natural plant or animal disease, which could impact the entire county (and beyond) before the disease or bio-agent is discovered. For this reason, this hazard category will be assessed on a countywide planning basis instead of establishing a separate geographic planning area for this type of event.

Although initial detection of this type of event is considered uncontrollable, it is highly possible an act of terrorism (domestic or other) could occur at any time given the right circumstances. However, the probability of future occurrence is reduced due to proactive preventative action on the part of Federal, State and local authorities. This proactive approach to preparation and prevention will help reduce the potential for losses to property and life as a result of terrorist or Foreign Animal Disease (FAD) outbreaks.

A review of this type of hazard revealed few sources for estimating risk associated with terrorism, agri-terrorism, and civil disorder, and appears to have a low risk probability. The State of Kansas required each County to develop a FAD for agricultural exotic diseases, and is included in the plan as a state-mandated planning hazard.

For planning purposes this hazard category is considered to be a multijurisdictional hazard and the entire planning area population is considered equally susceptible to Terrorism / Agri-terrorism / Civil Disorder.

### SUMMARY OF POTENTIAL HAZARD-RELATED EXPOSURE/LOSS IN JURISDICTIONS

### SUMMARY OF POTENTIAL HAZARD-RELATED EXPOSURE/LOSS IN SCHOOL JURISDICTIONS

## TSTM Wind

A severe thunderstorm is a thunderstorm which produces tornadoes, hail 0.75 inches or more in diameter, or winds of 50 knots (58 mph) or more. Structural wind damage or damaged crops may imply the occurrence of a severe thunderstorm. A thunderstorm is approaching severe levels when it contains winds of 35 to 49 knots (40 to 57 mph) or hail ½-inch or larger but less than ¾-inch in diameter. Although not considered “severe”, lightning and heavy rain can also accompany thunderstorms.

In the case of severe thunderstorms, hail, wind, and tornadoes, the location and frequency of previous events are probably the best determiners of future events. NCDC recorded events provided the basis for the natural hazards analysis for Leavenworth County, and identified severity and likelihood to prioritize the hazard.

The entire county is equally susceptible to damage from thunderstorm high wind (TSTM Wind), and for this Plan, is addressed as part of the multi-hazard planning category.

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# SUMMARY OF POTENTIAL HAZARD-RELATED EXPOSURE/LOSS IN JURISDICTIONS

| TSTM WIND: SUMMARY OF POTENTIAL HAZARD-RELATED EXPOSURE/LOSS IN JURISDICTIONS | | | | | |
|---|---|---|---|---|---|
| **RESIDENTIAL** | | | | | |
| Jurisdiction | Exposed Population | Exposed # of Buildings | Exposed Valuation $ | Estimated Damage as % | Potential Dollar Exposure / Loss |
| Leavenworth (UnInc.) | 19,552 | 27,045 | $2,478,970,122 | 10.00% | $247,897,012 |
| Lansing | 9,199 | 3,360 | $401,220,400 | 10.00% | $40,122,040 |
| Leavenworth | 35,420 | 11,801 | $956,813,642 | 10.00% | $95,681,364 |
| Basehor | 4,200 | 1,909 | $239,003,969 | 10.00% | $23,900,397 |
| Tonganoxie | 2,728 | 1,965 | $187,635,896 | 10.00% | $18,763,590 |
| Linwood | 391 | 228 | $9,644,437 | 10.00% | $964,444 |
| Easton | 362 | 154 | $3,740,260 | 10.00% | $374,026 |
| **COMMERCIAL** | | | | | |
| Jurisdiction | Exposed Population | Exposed # of Buildings | Exposed Valuation $ | Estimated Damage as % | Potential Dollar Exposure / Loss |
| Leavenworth (UnInc.) | 9,910 | 1,800 | $234,172,680 | 10.00% | $23,417,268 |
| Lansing | 3,400 | 158 | $29,183,840 | 10.00% | $2,918,384 |
| Leavenworth | 13,044 | 803 | $153,093,350 | 10.00% | $15,309,335 |
| Basehor | 1,178 | 69 | $14,414,870 | 10.00% | $1,441,487 |
| Tonganoxie | 1,337 | 175 | $16,604,530 | 10.00% | $1,660,453 |
| Linwood | 180 | 11 | $863,760 | 10.00% | $86,376 |
| Easton | 129 | 14 | $363,640 | 10.00% | $36,364 |
| **CRITICAL FACILITIES** | | | | | |
| Jurisdiction | Exposed Population | Exposed # of Buildings | Exposed Valuation $ | Estimated Damage as % | Potential Dollar Exposure / Loss |
| Leavenworth (UnInc.) | 8,154 | 589 | $2,978,889,920 | 10.00% | $297,888,992 |
| Lansing | 55 | 15 | $24,000,000 | 10.00% | $2,400,000 |
| Leavenworth | 304 | 241 | $735,091,700 | 10.00% | $73,509,170 |
| Basehor | 38 | 23 | $5,977,106 | 10.00% | $597,711 |
| Tonganoxie | 80 | 9 | $1,651,519 | 10.00% | $165,152 |
| Linwood | 2 | 13 | $650,000 | 10.00% | $65,000 |
| Easton | 1 | 11 | $668,000 | 10.00% | $66,800 |

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## SUMMARY OF POTENTIAL HAZARD-RELATED EXPOSURE/LOSS IN SCHOOL JURISDICTIONS

| TSTM WIND: SUMMARY OF POTENTIAL HAZARD-RELATED EXPOSURE/LOSS IN SCHOOL JURISDICTIONS | | | | | |
|---|---|---|---|---|---|
| **SCHOOL(S)** | | | | | |
| Jurisdiction | Exposed Population | Exposed # of Buildings | Exposed Valuation $ | Estimated Damage as % | Potential Dollar Exposure / Loss |
| University of St. Mary | 480 | 5 | $53,991,000 | 10.00% | $5,399,100 |
| USD 449 | 756 | 4 | $24,243,862 | 10.00% | $2,424,386 |
| USD 453 | 4,699 | 11 | $119,196,647 | 10.00% | $11,919,665 |
| USD 458 | 2,933 | 8 | $56,891,632 | 10.00% | $5,689,163 |
| USD 469 | 2,900 | 10 | $64,582,400 | 10.00% | $6,458,240 |
| USD 464 | 2,100 | 4 | $55,000,000 | 10.00% | $5,500,000 |
| **SUPPORTING FACILITIES** | | | | | |
| Jurisdiction | Exposed Population | Exposed # of Buildings | Exposed Valuation $ | Extimated Damage as % | Potential Dollar Exposure / Loss |
| University of St. Mary | 143 | 5 | $44,686,000 | 10.00% | $4,468,600 |
| USD 449 | 35 | 5 | $423,000 | 10.00% | $42,300 |
| USD 453 | 40 | 4 | $4,084,460 | 10.00% | $408,446 |
| USD 458 | 40 | 4 | $366,000 | 10.00% | $36,600 |
| USD 469 | 200 | 1 | $500,000 | 10.00% | $50,000 |
| USD 464 | 50 | 2 | $750,000 | 10.00% | $75,000 |

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# Utility Failure

Failure of electrical utilities or other components of the power infrastructure in Leavenworth County can seriously impact public safety and health, vital government services, and the economy of the county. Disruption of any of these functions could result from the majority of the natural, technological, and manmade hazards described in this plan. Reliable data at the local level was not available, so Leavenworth County relied on vulnerability data provided in the State Mitigation Plan for analysis of this potential hazard.

The electric power infrastructure in Kansas has been significantly affected by disasters and weather events in the past, and is expected to continue into the future. Potential losses to the electric line infrastructure are difficult to quantify. This information could potentially be obtained or estimated with assistance from rural electric cooperatives in future updates to this plan.

For purposes of this hazard mitigation plan, Leavenworth County will assess this hazard's vulnerability on a countywide planning basis instead of establishing separate geographic planning areas for this type of event. The MPC noted that the greatest exposure to this hazard is on the population of Leavenworth County rather than impacting physical County assets.

## SUMMARY OF POTENTIAL HAZARD-RELATED EXPOSURE/LOSS IN JURISDICTIONS

| UTILITY FAILURE: SUMMARY OF POTENTIAL HAZARD-RELATED EXPOSURE/LOSS IN JURISDICTIONS | | | | | |
|---|---|---|---|---|---|
| **RESIDENTIAL** | | | | | |
| Jurisdiction | Exposed Population | Exposed # of Buildings | Exposed Valuation $ | Estimated Damage as % | Potential Dollar Exposure / Loss |
| Leavenworth (UnInc.) | 19,552 | 0 | $0 | 0.00% | $0 |
| **COMMERCIAL** | | | | | |
| Jurisdiction | Exposed Population | Exposed # of Buildings | Exposed Valuation $ | Estimated Damage as % | Potential Dollar Exposure / Loss |
| Leavenworth (UnInc.) | 0 | 0 | $0 | 0.00% | $0 |
| **CRITICAL FACILITIES** | | | | | |
| Jurisdiction | Exposed Population | Exposed # of Buildings | Exposed Valuation $ | Estimated Damage as % | Potential Dollar Exposure / Loss |
| Leavenworth (UnInc.) | 0 | 0 | $0 | 0.00% | $0 |

## SUMMARY OF POTENTIAL HAZARD-RELATED EXPOSURE/LOSS IN SCHOOL JURISDICTIONS

# Wildfire

Wildfire in the State of Kansas is better defined as rangeland fire. This type of fire generally originates as a surface fire and can spread quickly across large areas. When wildfire does occur in Leavenworth County, it is rare that a home or business is lost, with most damage is limited to field crops. Wildfires are most common in the spring when brush is still brown and dry, and when fields have reached maturity in the fall months.

Statistical analysis for Leavenworth County indicates as average of 11.0 wildfire events a year. Since the vast majority of reported wildfire occurs in unpopulated areas of the county, vulnerability appears to be limited to the unincorporated areas of the County involving row crops, and is reported by the planning committee to have a low impact to infrastructure and people.

## SUMMARY OF POTENTIAL HAZARD-RELATED EXPOSURE/LOSS IN JURISDICTIONS

| WILDFIRE: SUMMARY OF POTENTIAL HAZARD-RELATED EXPOSURE/LOSS IN JURISDICTIONS | | | | | |
|---|---|---|---|---|---|
| **RESIDENTIAL** | | | | | |
| Jurisdiction | Exposed Population | Exposed # of Buildings | Exposed Valuation $ | Estimated Damage as % | Potential Dollar Exposure / Loss |
| Leavenworth (UnInc.) | 19,552 | 27,045 | $2,478,970,122 | 1.00% | $24,789,701 |
| **COMMERCIAL** | | | | | |
| Jurisdiction | Exposed Population | Exposed # of Buildings | Exposed Valuation $ | Estimated Damage as % | Potential Dollar Exposure / Loss |
| Leavenworth (UnInc.) | 9,910 | 1,800 | $234,172,680 | 1.00% | $2,341,727 |
| **CRITICAL FACILITIES** | | | | | |
| Jurisdiction | Exposed Population | Exposed # of Buildings | Exposed Valuation $ | Estimated Damage as % | Potential Dollar Exposure / Loss |
| Leavenworth (UnInc.) | 8,154 | 589 | $2,978,889,920 | 1.00% | $29,788,899 |

## SUMMARY OF POTENTIAL HAZARD-RELATED EXPOSURE/LOSS IN SCHOOL JURISDICTIONS

## Winter Storm

Winter Storms can include blizzards, ice/sleet storms, extreme windchill and other cold-related hazards that can impact a community, county or region. The probability of a severe Winter Storm event depends on winter weather patterns that pass through the state. The likelihood of future events is estimated to remain the same as currently calculated. Leavenworth County can expect approximately 1.53 major winter storm events per year.

The entire county is equally susceptible to damage from severe Winter Storms, and is included as a multijurisdictional planning hazard for this Plan.

Although we can extract data and probability of occurrence from historical information, the risk of a severe event occurring and the location of damage appear to be a random event.

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# SUMMARY OF POTENTIAL HAZARD-RELATED EXPOSURE/LOSS IN JURISDICTIONS

| WINTER STORM: SUMMARY OF POTENTIAL HAZARD-RELATED EXPOSURE/LOSS IN JURISDICTIONS | | | | | |
|---|---|---|---|---|---|
| **RESIDENTIAL** | | | | | |
| Jurisdiction | Exposed Population | Exposed # of Buildings | Exposed Valuation $ | Estimated Damage as % | Potential Dollar Exposure / Loss |
| Leavenworth (UnInc.) | 19,552 | 27,045 | $2,478,970,122 | 10.00% | $247,897,012 |
| Lansing | 9,199 | 3,360 | $401,220,400 | 10.00% | $40,122,040 |
| Leavenworth | 35,420 | 11,801 | $956,813,642 | 10.00% | $95,681,364 |
| Basehor | 4,200 | 1,909 | $239,003,969 | 10.00% | $23,900,397 |
| Tonganoxie | 2,728 | 1,965 | $187,635,896 | 10.00% | $18,763,590 |
| Linwood | 391 | 228 | $9,644,437 | 10.00% | $964,444 |
| Easton | 362 | 154 | $3,740,260 | 10.00% | $374,026 |
| **COMMERCIAL** | | | | | |
| Jurisdiction | Exposed Population | Exposed # of Buildings | Exposed Valuation $ | Estimated Damage as % | Potential Dollar Exposure / Loss |
| Leavenworth (UnInc.) | 9,910 | 1,800 | $234,172,680 | 10.00% | $23,417,268 |
| Lansing | 3,400 | 158 | $29,183,840 | 10.00% | $2,918,384 |
| Leavenworth | 13,044 | 803 | $153,093,350 | 10.00% | $15,309,335 |
| Basehor | 1,178 | 69 | $14,414,870 | 10.00% | $1,441,487 |
| Tonganoxie | 1,337 | 175 | $16,604,530 | 10.00% | $1,660,453 |
| Linwood | 180 | 11 | $863,760 | 10.00% | $86,376 |
| Easton | 129 | 14 | $363,640 | 10.00% | $36,364 |
| **CRITICAL FACILITIES** | | | | | |
| Jurisdiction | Exposed Population | Exposed # of Buildings | Exposed Valuation $ | Estimated Damage as % | Potential Dollar Exposure / Loss |
| Leavenworth (UnInc.) | 8,154 | 589 | $2,978,889,920 | 10.00% | $297,888,992 |
| Lansing | 55 | 15 | $24,000,000 | 10.00% | $2,400,000 |
| Leavenworth | 304 | 241 | $735,091,700 | 10.00% | $73,509,170 |
| Basehor | 38 | 23 | $5,977,106 | 10.00% | $597,711 |
| Tonganoxie | 80 | 9 | $1,651,519 | 10.00% | $165,152 |
| Linwood | 2 | 13 | $650,000 | 10.00% | $65,000 |
| Easton | 1 | 11 | $668,000 | 10.00% | $66,800 |

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## SUMMARY OF POTENTIAL HAZARD-RELATED EXPOSURE/LOSS IN SCHOOL JURISDICTIONS

| WINTER STORM: SUMMARY OF POTENTIAL HAZARD-RELATED EXPOSURE/LOSS IN SCHOOL JURISDICTIONS | | | | | |
|---|---|---|---|---|---|
| **SCHOOL(S)** | | | | | |
| Jurisdiction | Exposed Population | Exposed # of Buildings | Exposed Valuation $ | Estimated Damage as % | Potential Dollar Exposure / Loss |
| University of St. Mary | 480 | 5 | $53,991,000 | 10.00% | $5,399,100 |
| USD 449 | 756 | 4 | $24,243,862 | 10.00% | $2,424,386 |
| USD 453 | 4,699 | 11 | $119,196,647 | 10.00% | $11,919,665 |
| USD 458 | 2,933 | 8 | $56,891,632 | 10.00% | $5,689,163 |
| USD 469 | 2,900 | 10 | $64,582,400 | 10.00% | $6,458,240 |
| USD 464 | 2,100 | 4 | $55,000,000 | 10.00% | $5,500,000 |
| **SUPPORTING FACILITIES** | | | | | |
| Jurisdiction | Exposed Population | Exposed # of Buildings | Exposed Valuation $ | Extimated Damage as % | Potential Dollar Exposure / Loss |
| University of St. Mary | 143 | 5 | $44,686,000 | 10.00% | $4,468,600 |
| USD 449 | 35 | 5 | $423,000 | 10.00% | $42,300 |
| USD 453 | 40 | 4 | $4,084,460 | 10.00% | $408,446 |
| USD 458 | 40 | 4 | $366,000 | 10.00% | $36,600 |
| USD 469 | 200 | 1 | $500,000 | 10.00% | $50,000 |
| USD 464 | 50 | 2 | $750,000 | 10.00% | $75,000 |

## 4.5.4 Critical Facilities

An essential component of this Mitigation Plan is the inventory and identification of Leavenworth County's critical facilities. The objective of the critical facilities inventory is to maintain information on buildings and support infrastructure that are vital to the response and recovery of a community from a disaster. While it is important to reduce or eliminate risks to various sites throughout Leavenworth County, there are several types of structures that should be prioritized because damage to these critical facilities can delay recovery, impact the delivery of vital services, cause greater damages to other sectors of the county, or can put special populations at risk. For this reason, emphasis on planning and protection of critical facilities is a priority for this mitigation plan.

There is no definitive list regarding what should be considered a "critical facility." However, for purposes of this Mitigation Plan, Leavenworth County considers critical facilities to be those structures from which essential services and functions for the continuation of public safety actions and disaster recovery are performed or provided. These facilities include the supporting "life-line" infrastructure essential to the mission of critical facilities.

A "best available" inventory of Leavenworth County's public and private assets, along with known critical facilities, has been compiled using best available data. Sources used included the Division of Property Valuation (Kansas Department of Revenue), HAZUS, and RS Means Estimated Construction data. RS Means is the world's largest provider of construction cost and replacement cost data. Its data is

accepted and used by HAZUS and many other federal agencies. Since actual values associated with specific structures could not be produced, aggregate costs (assessed value or RS Means data), by class-type, were utilized along with the associated average unit cost. An objective was established to implement collection of this type of data / information for the county as they begin to develop and refine mitigation capability. It is anticipated that new information and data will continually be added to this plan as technical capabilities are enhanced and implemented.

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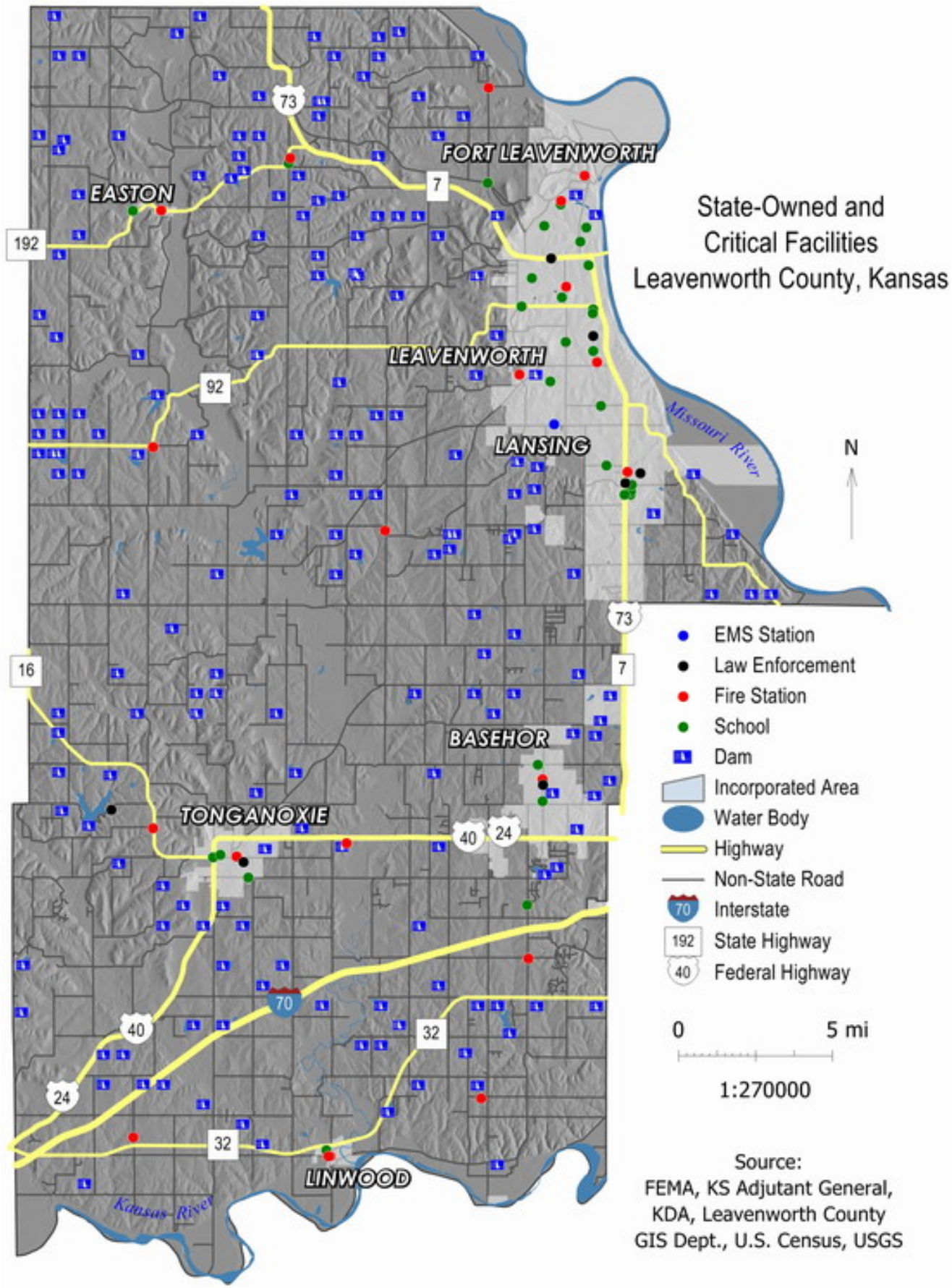
State-Owned and
Critical Facilities
Leavenworth County, Kansas
FORT LEAVENWORTH
EASTON
LEAVENWORTH
LANSING
BASEHOR
TONGANOXIE
LINWOOD
Missouri River
Kansas River
N
EMS Station
Law Enforcement
Fire Station
School
Dam
Incorporated Area
Water Body
Highway
Non-State Road
Interstate
State Highway
Federal Highway
0
5 mi
1:270000
Source:
FEMA, KS Adjutant General,
KDA, Leavenworth County
GIS Dept., U.S. Census, USGS

Critical Facility Vulnerability

The following vulnerability assessment tables have been completed in order to best assess the current vulnerability of Leavenworth County based upon the current number and value of structures of critical facilities.

Tables 4.5.4 (1) provides critical facilities ranked by required operational status during an emergency event as follows (also reference the Table heading for description of levels 1 through 3):

> Level 1 Facilities: Must not lose operational capability Level 2 Facilities: Must be operational within 24-hours following an event Level 3 Facilities: Must be operational within 72-hours following an event

## TABLE 4.5.4 (1) LEAVENWORTH COUNTY CRITICAL FACILITIES DEFINITION

TABLE 4.5.4 (1) LEAVENWORTH COUNTY CRITICAL FACILITIES DEFINITION

| LEVEL 1 Facilities | LEVEL 2 Facilities | LEVEL 3 Facilities |
|---|---|---|
| (must not lose operational capability) | (must be operational within 24 hours following event) | (must be operational within 72 hours following event) |
| Communications (radio, TV, similar)<br>County Emergency Operations Center (EOC)<br>Fire / EMS Stations<br>Hospital(s)<br>Law Enforcement (Police/Sheriff Bldgs) | Emergency shelters (schools)<br>Major government buildings<br>Major roads (Mi)<br>Bridges (No.) | Fuel storage areas<br>Electric / Gas utilities<br>Pumping stations<br>Response staging areas<br>Sewage treatment plants<br>*Transportation systems<br>Water treatment plants<br>Wells and storage tanks |

Table 4.5.4 (2) provides potential damage estimates of current (2008-2009) and future (2040) damage inventory for identified critical facilities in Leavenworth County. For planning purposes, the asset replacement value is assumed to remain at current replacement value when the county is experiencing a negative growth in population (KWO).

# TABLE 4.5.4 (2) LEAVENWORTH COUNTY CRITICAL FACILITIES INVENTORY

TABLE 4.5.4 (2) LEAVENWORTH COUNTY CRITICAL FACILITIES INVENTORY

| | | Current Conditions | | | Projection Yr: 2040 (CAGR: 1.03%) | | |
|---|---|---|---|---|---|---|---|
| Priority Level | Type of Facility | Number of Existing Buildings/ Facilities | Current Replacement Value | Current Number of People | Number of Future Buildings/ Facilities | Future Replacement Value | Future Number of People |
| 1 | Communications (radio, TV, similar) | 2 | $190,000 | 8 | 3 | $263,483 | 11 |
| 1 | County Emergency Operations Center (EOC) | 2 | $850,000 | 2 | 3 | $1,178,739 | 3 |
| 1 | Fire / EMS Stations | 17 | $15,000,000 | 40 | 24 | $20,801,271 | 55 |
| 1 | Hospital(s) | 2 | $9,975,000 | 75 | 3 | $13,832,845 | 104 |
| 1 | Law Enforcement (Police/Sheriff Bldgs) | 4 | $25,652,000 | 145 | 6 | $35,572,947 | 201 |
| 2 | Emergency shelters (schools) | 34 | $1,200,000 | 6,600 | 47 | $1,664,102 | 9,153 |
| 2 | Major government buildings | 64 | $1,402,039,920 | 1,200 | 89 | $1,944,280,841 | 1,664 |
| 2 | Major roads (Mi) | 192 | $648,758,000 | 0 | 267 | $899,666,074 | 0 |
| 2 | Bridges (No.) | 222 | $106,071,000 | 0 | 308 | $147,094,109 | 0 |
| 3 | Fuel storage areas | 1 | $4,500,000 | 7 | 1 | $6,240,381 | 10 |
| 3 | Electric / Gas utilities | 2 | $2,071,000 | 10 | 3 | $2,871,962 | 14 |
| 3 | Pumping stations | 0 | $0 | 0 | 0 | $0 | 0 |
| 3 | Response staging areas | 0 | $0 | 0 | 0 | $0 | 0 |
| 3 | Sewage treatment plants | 9 | $569,430,000 | 20 | 12 | $789,657,858 | 28 |
| 3 | *Transportation systems | 12 | $62,130,000 | 40 | 17 | $86,158,865 | 55 |
| 3 | Water treatment plants | 6 | $131,000,000 | 25 | 8 | $181,664,435 | 35 |
| 3 | Wells and storage tanks | 20 | $230,000 | 0 | 28 | $318,953 | 0 |

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TABLE NOTES:

*Transportation systems may include public and private airports, bus services, rail, etc.

**Flammable and hazardous materials storage areas.

The following Leavenworth County Public School stated that they provide shelter for students, staff and faculty during normal school operating hours when severe weather threatens in the following location:

**TABLE 4.5.4 (3) LEAVENWORTH COUNTY DESIGNATED SCHOOL TORNADO SHELTERS**

TABLE 4.5.4 (3) LEAVENWORTH COUNTY DESIGNATED SCHOOL TORNADO SHELTERS

| Name | Building Name | Address | Population |
|---|---|---|---|
| USD 469 | Lansing High School | 220 Lion Lane, Lansing, Kansas | 808 |

## 4.5.5 Development Trends and Implications

Land use patterns in Leavenworth County has experienced considerable change in past years with increased urban growth. The 2005 Kansas Land Cover Patterns map produced by the Kansas Applied Remote Sensing (KARS) program provides a fairly accurate assessment of 11 land use/land cover classes. The bulk of the land cover in the county (~84%) is comprised of woodland, cropland, and grassland. Residential and commercial / industrial development comprises 5.66% of the land cover primarily in and around the incorporated cities of Leavenworth, Lansing, Tonganoxie, Basehor, Linwood, and Easton. Generally, built up areas continue to be located in or around the major community in the county, with smaller concentrations located in rural areas. Commercial land use is primarily limited to these same communities. Overall, commercial, industrial, and residential development in Leavenworth County has been regulated.

The State of Kansas has developed a unique method for utilizing water use data to determine not only future water use, but also to project population in the state. Additionally, this method will be used to verify the accuracy of the U.S.Census Bureau's sub-county population estimates for Kansas. This method was developed by the Kansas Water Office and approved by the Kansas Water Authority.

In November 1998, the Kansas Water Office completed population and water demand projections for every county, city, and rural water district in Kansas for the years 2000, 2010, 2020, 2030, and 2040. These data will be utilized for growth projections for the county. Information regarding methodology and projections can be found at: www.kwo.org/index.htm.

Leavenworth County has experienced an overall increase in population since 1900. Population growth has increased from 40,940 in 1900 to 68,691 in 2000. The county is semi-urban, and is located within a region that makes economic development somewhat easier than in other areas in the state, as the county is located close to a major metropolitan area for direct access to major services. (Kansas Department of Commerce, 2000)

### *Leavenworth (UnInc.): Residential, Commercial, and Population Growth - Present and Future*

Residential and commercial development is primarily concentrated around the largest incorporated cities of Leavenworth and Lansing, and the smaller rural communities of Tonganoxie, Basehor, Easton, and Linwood. Leavenworth County is projected to grow in overall residential and commercial development by 1.29% annually, as projected by the Kansas Water Office (compound annual growth rate through 2040).

While difficult to forecast, Leavenworth County's future development trend through 2040 is assumed to increase proportionate to the increase in population and will need to monitor and update mitigation

initiatives as the process unfolds. The property valuation rate, for the forseeable future, is also expected to parallel the county population growth pattern, 1.29% growth annually.

### *Basehor: Residential, Commercial, and Population Growth - Present and Future*

Basehor's residential and commercial development is projected to experience a gradual increase in population growth over the next 32 years of 0.97% annually (Kansas Water Office [KWO]). Projections are based on KWO data using Compound Annual Growth Rate (CAGR) as the means to develop projected growth. Land use includes commercial, industrial, and residential development in Basehor, and has been largely regulated by zoning and construction codes.

While difficult to forecast, Basehor's future development trend through 2040 is assumed to increase proportionate to the increase in population and will need to monitor and update mitigation initiatives as the process unfolds. The property valuation rate, for the foreseeable future, is also expected to parallel the city population growth pattern of 0.97% annually.

### *Easton: Residential, Commercial, and Population Growth - Present and Future*

Easton's residential and commercial development is projected to experience neutral growth over the next 32 years, as projected by the KWO. Projections are based on KWO data using CAGR as the means to develop projected growth. Land use includes commercial and residential development in Easton, and has been largely unregulated by zoning and construction codes.

While difficult to forecast, Easton's future development trend through 2040 is assumed to remain neutral proportionate to the neutral growth in population and will need to monitor and update mitigation initiatives as the process unfolds. The property valuation rate, for the foreseeable future, is also expected to parallel the city population growth pattern, and will remain neutral (0% growth) for purposes of mitigation planning until future data is available.

### *Lansing: Residential, Commercial, and Population Growth - Present and Future*

Lansing's residential and commercial development is projected to experience a gradual increase in population growth over the next 32 years of 1.33% annually (KWO). Projections are based on KWO data using CAGR as the means to develop projected growth. Land use includes commercial, industrial, and residential development in Lansing, and has been largely regulated by zoning and construction codes.

While difficult to forecast, Lansing's future development trend through 2040 is assumed to increase proportionate to the increase in population and will need to monitor and update mitigation initiatives as the process unfolds. The property valuation rate, for the foreseeable future, is also expected to parallel the city population growth pattern of 1.33% annually.

### *Leavenworth: Residential, Commercial, and Population Growth - Present and Future*

Leavenworth's residential and commercial development is projected to experience a gradual increase in population growth over the next 32 years of 0.52% annually (KWO). Projections are based on KWO data using CAGR as the means to develop projected growth. Land use includes commercial, industrial, and residential development in Leavenworth, and has been largely regulated by zoning and construction codes.

While difficult to forecast, Leavenworth's future development trend through 2040 is assumed to increase proportionate to the increase in population and will need to monitor and update mitigation initiatives as the process unfolds. The property valuation rate, for the foreseeable future, is also expected to parallel the city population growth pattern of 0.52% annually.

### *Linwood: Residential, Commercial, and Population Growth - Present and Future*

Linwood's residential and commercial development is projected to experience a gradual increase in

population growth over the next 32 years of 0.73% annually (KWO). Projections are based on KWO data using CAGR as the means to develop projected growth. Land use includes commercial, industrial, and residential development in Linwood, and has been largely regulated by zoning and construction codes.

While difficult to forecast, Linwood's future development trend through 2040 is assumed to increase proportionate to the increase in population and will need to monitor and update mitigation initiatives as the process unfolds. The property valuation rate, for the foreseeable future, is also expected to parallel the city population growth pattern of 0.73% annually.

### *Tonganoxie: Residential, Commercial, and Population Growth - Present and Future*

Tonganoxie's residential and commercial development is projected to experience a gradual increase in population growth over the next 32 years of 1.39% annually (KWO). Projections are based on KWO data using CAGR as the means to develop projected growth. Land use includes commercial, industrial, and residential development in Tonganoxie, and has been largely regulated by zoning and construction codes.

While difficult to forecast, Tonganoxie's future development trend through 2040 is assumed to increase proportionate to the increase in population and will need to monitor and update mitigation initiatives as the process unfolds. The property valuation rate, for the foreseeable future, is also expected to parallel the city population growth pattern of 1.39% annually.

### *University of St. Mary: Residential, Commercial, and Population Growth - Present and Future*

The University of St. Mary is a co-educational, public institution of higher learning located in Leavenworth, Kansas. The university offers a number of undergraduate programs, as well as Masters programs in education and business, among others. Due to the state-wide attendence base for the University, the projected growth rate for the college will be based on state averages.

While difficult to forecast, the university's future development trend through 2040 is assumed to increase proportionately to the increase in population of the State of Kansas and will need to monitor and update mitigation initiatives as the process unfolds. The property valuation rate for the foreseeable future is also expected to parallel the increase in population growth of 0.69% annually through 2040 (KWO).

### *USD 449: Residential, Commercial, and Population Growth - Present and Future*

USD 449 currently has four active schools located in the cities of Easton (three schools) and Leavenworth (one school). School enrollment is largely determined by overall growth patterns of the city in which the schools reside. For planning purposes, the Kansas Water Office data, for the cities of Easton and Leavenworth were used to project population trends for the School District through 2040.

While difficult to forecast future commercial and residential development, estimates of future community growth help predict school funding decisions and facility expansion needs for the immediate future. Commercial and residential growth projections are assumed to parallel the increase or decrease in local population projections, and will need to monitor and update mitigation initiatives as the process unfolds. The property valuation rate, for the foreseeable future, is also expected to parallel the city population growth patterns.

It is likely that the City of Leavenworth will continue to see a gradual population increase over the next 32 years of 0.52%, while the commercial and industrial growth of the City of Easton is projected to remain neutral (0.0%). These figures are based on a compound annual growth rate (CAGR) developed from the Kansas Water Office population projections through 2040.

### *USD 453: Residential, Commercial, and Population Growth - Present and Future*

USD 453 currently has 11 schools located in the City of Leavenworth. School enrollment is largely determined by overall growth patterns of the city in which the schools reside. For planning purposes, the

Kansas Water Office data was used to project population trends for each town through 2040.

While difficult to forecast future commercial and residential development, estimates of future community growth help predict school funding decisions and facility expansion needs for the immediate future. Commercial and residential growth projections are assumed to parallel the increase or decrease in local population projections, and will need to monitor and update mitigation initiatives as the process unfolds. The property valuation rate, for the foreseeable future, is also expected to parallel the city population growth patterns.

It is likely that the City of Leavenworth will continue to see a gradual population increase over the next 32 years of 0.52%. This figure is based on a CAGR developed from the Kansas Water Office population projections through 2040.

### *USD 458: Residential, Commercial, and Population Growth - Present and Future*

USD 458 currently has seven schools located in the cities of Basehor and Linwood. School enrollment is largely determined by overall growth patterns of the city in which the schools reside. For planning purposes, the Kansas Water Office data was used to project population trends for each town through 2040.

While difficult to forecast future commercial and residential development, estimates of future community growth help predict school funding decisions and facility expansion needs for the immediate future. Commercial and residential growth projections are assumed to parallel the increase or decrease in local population projections, and will need to monitor and update mitigation initiatives as the process unfolds. The property valuation rate, for the foreseeable future, is also expected to parallel the city population growth patterns.

It is likely that the City of Basehor will continue to see a gradual population increase over the next 32 years of 0.97%, while the population growth of Linwood is projected to increase 0.73% annually. These figures are based on a CAGR developed from the Kansas Water Office population projections through 2040.

### *USD 464: Residential, Commercial, and Population Growth - Present and Future*

USD 464 currently has four schools located in the City of Tonganoxie. School enrollment is largely determined by overall growth patterns of the city in which the schools reside. For planning purposes, the Kansas Water Office data was used to project population trends for each town through 2040.

While difficult to forecast future commercial and residential development, estimates of future community growth help predict school funding decisions and facility expansion needs for the immediate future. Commercial and residential growth projections are assumed to parallel the increase or decrease in local population projections, and will need to monitor and update mitigation initiatives as the process unfolds. The property valuation rate, for the foreseeable future, is also expected to parallel the city population growth patterns.

It is likely that the City of Tonganoxie will continue to see a gradual population increase over the next 32 years of 1.39%. This figure is based on a CAGR developed from the Kansas Water Office population projections through 2040.

### *USD 469: Residential, Commercial, and Population Growth - Present and Future*

USD 469 currently has three schools located in the City of Lansing. School enrollment is largely determined by overall growth patterns of the city in which the schools reside. For planning purposes, the Kansas Water Office data was used to project population trends for each town through 2040.

While difficult to forecast future commercial and residential development, estimates of future community growth help predict school funding decisions and facility expansion needs for the immediate future.

Commercial and residential growth projections are assumed to parallel the increase or decrease in local population projections, and will need to monitor and update mitigation initiatives as the process unfolds. The property valuation rate, for the foreseeable future, is also expected to parallel the city population growth patterns.

It is likely that the City of Lansing will continue to see a gradual population increase over the next 32 years of 1.33%. This figure is based on a CAGR developed from the Kansas Water Office population projections through 2040.

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# 5.0 Mitigation Strategy

This section of the Plan outlines Leavenworth County's overall strategy and capabilities to reduce their jurisdiction's vulnerability to the effects of natural hazards, and include a discussion of Mitigation Actions and Techniques. The Mitigation Actions are short-term, specific measures to be undertaken by Leavenworth County in order to achieve the identified objectives. Most of these actions are also hazard-specific. Each action identifies the objective(s) it is intended to achieve, includes some general background information to justify the proposed action, and provides measures to assure successful and timely implementation.

It should be noted that individual risk assessment maps were completed for the unincorporated county, and each of the planning jurisdictions. Profile maps were provided to each jurisdiction to identify land use information, critical facility information, infrastructure, and hazard areas. The local teams utilized these maps to help identify their jurisdictional goals, objectives, and mitigation actions.

### Mitigation Activities

In formulating this Mitigation Strategy, a wide range of activities were considered and discussed in order to help achieve county goals and lessen the vulnerability of Leavenworth County to the effects of natural hazards. For each hazard ranked in the risk and vulnerability assessment as high or moderate (see Table 5.0 (1)), the Mitigation Planning Committee considered the six categories of mitigation techniques when developing Actions for this plan. Those six categories are enumerated in Tables 5.0 (2) through 5.0 (7). A list of all actions considered for this plan is provided in the appendix.

### Table 5.0 (1) Prioritized Hazards (High and Moderate)

Table 5.0 (1) Prioritized Hazards (High and Moderate)

| Hazard |
|---|
| Flood |
| Hail |
| Wildfire |
| Winter Storm |
| TSTM Wind |
| Excessive Heat |
| Tornado |
| Utility Failure |
| Dam/Levee |
| Terrorism / AT / CD |

### Mitigation Activities and Techniques

Table 5.0 (2) Prevention

Prevention activities are intended to keep hazard problems from getting worse. They are particularly effective in reducing a jurisdiction's future vulnerability, especially in areas where development has not occurred or capital improvements have not been substantial. The following techniques were discussed and those checked were selected for use in the plan.

Mitigation Activities and Techniques

| Technique | Selected for Objective/Action |
|---|---|
| Planning and Zoning | X |
| Open space preservation | X |
| Floodplain regulations | X |
| Stormwater management | X |
| Drainage system maintenance | X |
| Capital improvements programming | X |
| Shoreline/riverine/fault zone setbacks | |

## Table 5.0 (3) Property Protection

Property protection measures protect existing structures by modifying buildings to withstand hazardous events, or removing structures from hazardous locations. The following techniques were discussed and those checked were selected for use in the plan.

Mitigation Activities and Techniques

| Technique | Selected for Objective/Action |
|---|---|
| Acquisition | X |
| Relocation | |
| Building elevation | |
| Critical facilities protection | X |
| Retrofitting (i.e., windproofing, floodproofing, seismic design standards, etc.) | X |
| Insurance | X |

## Table 5.0 (4) Natural Resource Protection

Natural resource protection activities reduce the impact of natural hazards by preserving or restoring natural areas and their mitigative functions. Such areas include floodplains, wetlands and dunes. Parks, recreation or conservation agencies and organizations often implement these measures. The following techniques were discussed and those checked were selected for use in the plan.

Mitigation Activities and Techniques

| Technique | Selected for Objective/Action |
|---|---|
| Floodplain protection | X |
| Riparian buffers | X |
| Fire resistant landscaping | |
| Fuel Breaks | |
| Erosion and sediment control | X |
| Wetland preservation and restoration | |
| Habitat preservation | |
| Slope stabilization | |
| Agriculture and Livestock protection | X |

## Table 5.0 (5) Structural Projects

Structural mitigation projects are intended to lessen the impact of a hazard by modifying the environmental natural progression of the hazard event. They are usually designed by engineers and managed or maintained by public works staff. The following techniques were discussed and those checked were selected for use in the plan.

Mitigation Activities and Techniques

| Technique | Selected for Objective/Action |
|---|---|
| Levees/dikes/floodwalls/seawalls | X |
| Diversions/Detention/Retention | |
| Channel modification | |
| Storm sewers | X |
| Safe Rooms/ Storm Shelters | X |

## Table 5.0 (6) Emergency Services

Although not typically considered a “mitigation technique,” emergency service measures do minimize the impact of a hazard event on people and property. These commonly are actions taken immediately prior to, during, or in response to a hazard event. The following techniques were discussed and those checked were selected for use in the plan.

Mitigation Activities and Techniques

| Technique | Selected for Objective/Action |
|---|---|
| Warning systems | X |
| Public protection | X |
| Emergency facilities and equipment | X |
| Evacuation planning and management | |
| Sandbagging for flood protection | |
| Installing shutters for wind protection | |

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Table 5.0 (7) Public Information and Awareness

Public Information and Awareness activities are used to advise residents, business owners, potential property buyers, and visitors about hazards, hazardous areas, and mitigation techniques they can use to protect themselves and their property. The following techniques were discussed and those checked were selected for use in the plan.

Mitigation Activities and Techniques

| Technique | Selected for Objective/Action |
|---|---|
| Outreach projects | X |
| Speaker series/demonstration events | X |
| Hazard map information | X |
| Real estate disclosure | |
| Library materials | X |
| School children education | |
| Hazard expositions | X |

## Mitigation Techniques for Leavenworth County

When considering the most appropriate mitigation techniques for Leavenworth County to undertake, the Mitigation Planning Committee reviewed the State Mitigation Plan and hazards list. More importantly, Leavenworth County contracted to have a specific all-hazard analysis performed in 2007 to identify specific risk and vulnerability in the county. Hazard categories from the hazard analysis included natural, chemical, vector, and civil/societal risks.

Following the review and discussion, a matrix was developed to target the plan's priorities for proposed mitigation actions. Consideration was given to potential county funding, technical capability, and overall best approach to begin reducing exposure to hazards within the jurisdiction. Primary planning categories used are presented in Table 5.0 (8).

### Table 5.0 (8) MITIGATION TECHNIQUES

Table 5.0 (8) MITIGATION TECHNIQUES

| HIGH RISK HAZARDS | Prevention | Property Protection | Natural Resource Protection | Structural Projects | Emergency Services | Public Information and Awareness |
|---|---|---|---|---|---|---|
| Flood | X | X | X | X | X | X |
| Hail | | X | | | X | X |
| Wildfire | X | X | X | | X | X |
| Winter Storm | | X | | | X | X |
| TSTM Wind | | X | | X | X | X |
| MODERATE RISK HAZARDS | Prevention | Property Protection | Natural Resource Protection | Structural Projects | Emergency Services | Public Information and Awareness |
| Excessive Heat | | | | | X | X |
| Tornado | | X | | X | X | X |
| Utility Failure | X | | | | X | X |
| Dam/Levee | | X | X | X | X | X |
| Terrorism / AT / CD | | | X | | X | X |

## 5.1 MultiJurisdictional Goals and Objectives

*Multihazard Requirement §201.6(c)(3)(i): [The hazard mitigation strategy shall include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.*

This section of the Plan outlines Leavenworth County's overall strategy to reduce their jurisdiction's vulnerability to the effects of natural hazards. The goals and objectives are provided below.

Mitigation Goals - identifies the goal statements established by Leavenworth County for this mitigation plan. Each goal is meant to be general and broad in nature, and can only be achieved through the long-term implementation of more specific objectives. It is intended that each goal listed below will be more specifically addressed and realized through the implementation of short-term mitigation objectives and actions.

Mitigation Objectives - The mitigation objectives are designed to support and correspond directly with the jurisdiction goals to provide Leavenworth County with some measurable, mid-range targets (2-5 years). Each objective is numbered (i.e., "1.1"), with the first digit representing the corresponding jurisdictional goal.

## TABLE 5.1 (1) LEAVENWORTH COUNTY GOALS AND OBJECTIVES

TABLE 5.1 (1) LEAVENWORTH COUNTY GOALS AND OBJECTIVES

| Goal | |
|---|---|
| 1 Increase the jurisdiction's internal capabilities to mitigate the effects of terrorism, natural, manmade, and technological hazards | |
| **Objectives** | |
| 1.1 | Maintain and increase current jurisdiction surveillance to assist in future reduction to any overall flood issues of the jurisdiction. |
| 1.2 | Enhance the jurisdiction's capability to conduct hazard risk assessments, demonstrate funding needs, and track mitigation activities throughout the jurisdiction. |
| 1.3 | Continue enhancement of current emergency services to protect public health and safety. |
| 1.4 | Protect life, property, and the economy by eliminating or minimizing the present and future vulnerability to wildfire hazards. |
| Goal | |
| 2 Enhance existing or design and adopt new policies that will reduce the potential damaging effects of hazards without hindering other jurisdictional goals | |
| **Objectives** | |
| 2.1 | Discourage development in the floodplain to promote protection of life and property, and reduce risk exposure to future flood conditions. |
| 2.2 | Preserve the natural and beneficial functions of the jurisdiction's floodplain along the Missouri and Kansas rivers and major tributaries through continued support of natural resource protection policies and by discouraging growth in environmentally sensi |
| 2.3 | Develop and recommend building codes for new construction using wind-resistant design techniques that will limit damage caused by high winds and reduce the amount of wind-borne debris. |
| 2.4 | Research and develop means to provide high-risk populations with access to tornado-safe structures. |
| Goal | |
| 3 Protect the jurisdiction's most vulnerable populations, buildings and critical facilities through the implementation of cost-effective and technically feasible mitigation projects | |
| **Objectives** | |
| 3.1 | Maximize the use of available hazard mitigation grant programs to protect the jurisdiction's most vulnerable populations and structures. |
| 3.2 | Protect vital / critical facilities from the effects of natural hazards to the maximum extent possible. |
| Goal | |
| 4 Protect public health, safety and welfare by increasing the public awareness of existing hazards and by fostering both individual and public responsibility in mitigating risks due to those hazards | |
| **Objectives** | |
| 4.1 | Increase the level of knowledge and awareness for the jurisdiction's residents on the potential hazards that routinely threaten the area. |
| 4.2 | Educate residents to the dangers of wildfire and the protection measures that may be taken such as buffer zones, etc., including regulations regarding open burning and burn bans. |
| 4.3 | Promote and educate the jurisdiction's public and private sectors on potential agricultural terrorism and bio-terrorism. |

# 5.2 Mitigation Actions

*Multihazard Requirement §201.6(c)(3)(ii): [The mitigation strategy shall include a] section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the*

*effects of each hazard, with particular emphasis on new and existing buildings and infrastructure. Multihazard Requirement: §201.6(c)(3)(iii): [The mitigation strategy section shall include] an action plan describing how the actions identified in section (c)(3)(ii) will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.*

The mitigation actions proposed for Leavenworth County are listed on the pages that follow. Each has been designed to achieve the goals and objectives identified through this multi-jurisdictional hazard mitigation plan. Each proposed action includes the following:

> (1) the appropriate category for the mitigation technique; (2) the hazard it is designed to mitigate; (3) the objective(s) it is intended to help achieve; (4) some general background information; (5) the priority level for its implementation (high, moderate or low); (6) potential funding sources, if applicable; (7) the agency/person assigned responsibility for implementing each strategy; (8) a target completion date.

Again, it is important to note that these mitigation actions are short-term, specific measures to be undertaken by Leavenworth County. It is expected this component of the plan will be the most dynamic; it will be used as the primary indicator to measure the plan's progress over time and will be routinely updated and/or revised through future planning efforts.

### Action Item Prioritization

The MPC qualitatively prioritized the four county goals based on protection of life and property, public awareness, emergency services, implementation, and state-required planning directives (i.e., Foreign Animal Disease, and Bio-terrorism plans).

The risk assessment served as the basis for prioritizing hazards in terms of county risk (Likelihood x Severity = Risk). The prioritization represents current and future risk based on objective criteria.

The final step was to prioritize the action items as high, moderate or low based on a qualitative analysis for actions deemed to be readily achievable. Emphasis was placed on education and public awareness as a high priority, as knowledge helps reduces risk at the individual level. During annual review of the plan, new and completed action items will be identified and appropriate changes made to the action plan.

### Benefit - Cost Review

At the beginning of the planning process, each jurisdiction was asked to complete a questionnaire/survey which covered six factors including, but not limited to:

- Staff & Organizational Capability
- Administrative and Technical Capability
- Policy & Program Capability
- Fiscal Capability
- Legal Authority
- Political Willpower

These topics are in essence the "STAPLEE" categories recommended by the FEMA Guidance on Mitigation Planning. As a result of review, discussion, and the responses to the six factors listed above, the MPC choose to use Method 2A, Simple Listing, (FEMA 386-5) as a qualitative method to generate a benefit to cost review. The consultant reviewed the responses and, where needed, asked for clarification. These responses were used to develop an overall strategy for the multi-jurisdictional plan. (The detail of the responses can be reviewed at Section 3.10 and Section 4.5.5.)

A summary of the responses and the draft strategy was introduced at the first planning meeting. The factors which universally impacted the rank of all actions were limited staff capability, limited fiscal capability, and cautious political willpower. Subsequent to the first planning meeting, the jurisdictions

were asked to consider its responses to the questionnaire/survey and choose actions associated with the prioritized hazards. These choices were made in consideration of each jurisdictions responses to the STAPLEE based answers. Once this initial prioritization was made, the jurisdictions were asked to rank the actions by adding consideration of cost. In other words, in their opinion, which actions provided the best benefit for the selected hazards and the associated cost.

Where budgetary or estimated costs for an action were available, that value is included. In many cases, specific detail of potential actions or projects was not available. The use of estimated cost categories, based on how funding is accomplished, was recommended as a starting point for evaluation. Those categories are generally defined as follows:

No-cost/low-cost (less than $5,000);

Requires appropriation of funds (greater than $5,000 and less than $20,000); or

Requires significant funding (Greater than $20,000).

In general, no cost/low cost can be funded as part of operating expenditures; appropriation of funding requires an action by the governing commission or council or prior budget requests; and significant funding would require action by the governing body and potential commitment of outside funding sources.

From a cost perspective, the jurisdictions chose to prioritize low-cost actions with specific benefit as high ranking actions. A moderate ranking was given to actions which required appropriation of funding and provided a specific benefit to an entire community, distinct population. All other actions were assigned a lower priority. Actions were then given a final ranking by each jurisdiction to match the cost with overall conditions, capability, and political climate. These rankings will be reviewed as part of the overall yearly plan review process.

## 5.2.1 MultiJurisdictional Actions

### MultiJurisdictional Actions

| 1. Leavenworth County and the cities of Basehor, Easton, Lansing, Leavenworth, Linwood, and Tonganoxie are committed to continued participation and compliance with the National Flood Insurance Program (NFIP). | |
|---|---|
| Category: | Prevention |
| Jurisdiction: | MultiJurisdictional |
| Hazard: | Flood |
| Goal.Objective: | 1.1, 1.2, |
| Background / Benefit: | The decision on whether to join the NFIP is very important for a jurisdiction (community). There is no Federal law that requires a jurisdiction to join the program, and participation is voluntary. A benefit of participation is that the citizens are provided the opportunity to purchase flood insurance to protect themselves against flood losses. Another consideration is that a jurisdiction that has been identified by FEMA as being flood-prone and has not joined the NFIP within one year of being notified of being mapped as flood-prone will be sanctioned. Jurisdictions that regulate development in floodplains are able to participate in the NFIP. To participate in the NFIP the jurisdiction must adopt and enforce floodplain management regulations that meet or exceed the minimum requirements of the program. |
| Priority: | High |
| Funding Sources: | State/FEMA/Program Grants |
| Responsibility Assigned to: | County Planners / City Officials |
| Target Completion Date: | Continuous |
| Cost of Action: | No Cost / Low Cost |

| 2. Contact owners identified in high-risk flood areas and inform them of potential availability of assistance through the Federal Flood Mitigation Assistance (FEMA) program, in addition to other flood protection measures. | |
|---|---|
| Category: | Public Information and Awareness |
| Jurisdiction: | MultiJurisdictional |
| Hazard: | Flood |
| Goal.Objective: | 1.1, 2.1, 3.1, 4.1, |
| Background / Benefit: | Property owners should be contacted every year to promote the availability of the FEMA funding and to determine their level of interest in applying for the program. |
| Priority: | High |
| Funding Sources: | Local |
| Responsibility Assigned to: | County Planners / City Officials |
| Target Completion Date: | Continuous |
| Cost of Action: | No Cost / Low Cost |

| 3. Advertise and promote the availability of flood insurance to property owners by direct mail once a year. | |
|---|---|
| Category: | Public Information and Awareness |
| Jurisdiction: | MultiJurisdictional |
| Hazard: | Flood |
| Goal.Objective: | 1.1, 4.1, |
| Background / Benefit: | Leavenworth County, including the cities of Leavenworth, Lansing, Basehor, Easton, Tonganoxie, and Linwood, participates in the National Flood Insurance Program (NFIP). There are currently 214 policies in effect, with a total coverage amount of $41,122,700. Since the jurisdiction joined the program, there have been 197 claims paid for a total loss paid amount of $2,260,341. (Source: FEMA, 2008). NFIP flood insurance policies protect property owners by offering affordable rates for protecting both structures and contents. |
| Priority: | High |
| Funding Sources: | Local |
| Responsibility Assigned to: | County Planners / City Officials |
| Target Completion Date: | Continuous |
| Cost of Action: | Select A Cost Type |

| 4. Collect educational materials on individual and family preparedness / mitigation measures for property owners, and display at both the library and routinely visited government offices. | |
|---|---|
| Category: | Public Information and Awareness |
| Jurisdiction: | MultiJurisdictional |
| Hazard: | Multi-Hazard |
| Goal.Objective: | 1.1, 4.1, 4.2, 4.3, |
| Background / Benefit: | FEMA, the Kansas Division of Emergency Management, the National Weather Service and other agencies provide information brochures and pamphlets on property protection measures at no cost to local governments. |
| Priority: | High |
| Funding Sources: | Local |
| Responsibility Assigned to: | Chamber of Commerce/ Emergency Management/ City Officials |
| Target Completion Date: | Continuous |
| Cost of Action: | No Cost / Low Cost |

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| 5. Annually host a public “hazards workshop” in combination with local festivals, fairs, or other appropriate events. | |
|---|---|
| Category: | Public Information and Awareness |
| Jurisdiction: | MultiJurisdictional |
| Hazard: | Multi-Hazard |
| Goal.Objective: | 4.1, 4.2, 4.3, |
| Background / Benefit: | A hazard workshop for county residents should be added to an established event drawing large crowds. The workshop should be geared toward educating them on the hazards that threaten Leavenworth County, and the mitigation and preparedness measures available to protect them. Guest speakers from the National Weather Service, the Kansas Division of Emergency Management, and other relevant agencies should be invited to attend, and educational displays/handouts should be provided such as Flood Insurance Rate Maps, FEMA publications, safety tips, etc. |
| Priority: | High |
| Funding Sources: | Local |
| Responsibility Assigned to: | City and County Planners / Emergency Management |
| Target Completion Date: | Continuous |
| Cost of Action: | No Cost / Low Cost |

| 6. Promote and educate the jurisdiction's public and private sectors on potential agricultural terrorism and bio-terrorism issues that can severely impact the county and regional economies, and develop and implement plans to address these issues. | |
|---|---|
| Category: | Natural Resources Protection |
| Jurisdiction: | MultiJurisdictional |
| Hazard: | Terrorism/AT/CD |
| Goal.Objective: | 4.3, |
| Background / Benefit: | Leavenworth County is basically an agricultural community. A natural or intentional introduction of a foreign animal disease would be devastating to the local, regional state, economies. This annex will be added to the Local Emergency Operations Plan, a separate part of the plan addressing FAD, with additional annexes developed in the future to address other types of terrorism. |
| Priority: | High |
| Funding Sources: | Local / State/ Local |
| Responsibility Assigned to: | County Health Department/ County Emergency Management/ County Extension/ Local Producers |
| Target Completion Date: | Continuous |
| Cost of Action: | No Cost / Low Cost |

| 7. The County and local governments will work with the Kansas Department of Agriculture - Division of Water Resources to educate and promote local jurisdictional participation in the National Flood Insurance Program's Community Rating System (CRS). | |
|---|---|
| Category: | Property Protection |
| Jurisdiction: | MultiJurisdictional |
| Hazard: | Flood |
| Goal.Objective: | 1.1, 1.2, 2.1, |
| Background / Benefit: | The Kansas Division of Water Resources provides local training and education on the benefits of participation in the NFIP. The program provides availability of flood insurance to individuals whose local governments participate in the program. Flood insurance claims are paid even if a disaster is not declared by the President, and there is no payback requirement. Flood insurance policies are continuous, and are not non-renewed or cancelled for repeat losses. |
| Priority: | High |
| Funding Sources: | Local/ State |
| Responsibility Assigned to: | Emergency Management / City Officials |
| Target Completion Date: | Continuous |
| Cost of Action: | No Cost / Low Cost |

| 8. Establish, promote, and fund continuity of water systems between rural water districts to larger water departments to manage future growth in the county. | |
|---|---|
| Category: | Prevention |
| Jurisdiction: | MultiJurisdictional |
| Hazard: | Multi-Hazard |
| Goal.Objective: | 3.1, 3.2, |
| Background / Benefit: | The rural water districts are in need to have some connectivity to larger municipal water departments to continue growth, and also to assure continuous water supply to all districts if one district is jeopardized with lost of water or contamination of the supply. Seek funding through Federal and State grants to accomplish this task. |
| Priority: | Moderate |
| Funding Sources: | Local/State/Federal |
| Responsibility Assigned to: | Water Departments / Water Districts |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | Requires Funding |

| 9. Encourage the construction of safe rooms and storm shelters in public and private schools, day care centers and senior care facilities. | |
|---|---|
| Category: | Property Protection |
| Jurisdiction: | MultiJurisdictional |
| Hazard: | Tornado |
| Goal.Objective: | 2.3, 2.4, 3.1, 3.2, |
| Background / Benefit: | When severe weather threatens, individuals and families need advance warning and protection from the dangerous forces of extreme winds. Individuals and communities in high-risk tornado and hurricane areas need structurally sound shelters and early alert systems. |
| Priority: | High |
| Funding Sources: | FEMA/State/Local |
| Responsibility Assigned to: | School Districts / City Officials / State of Kansas / FEMA |
| Target Completion Date: | Continuous |
| Cost of Action: | No Cost / Low Cost |

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| 10. Prepare and adopt an Outdoor Warning Sirens Plan for the county, including consideration of the unique geographical locations, technical requirements, system types and operational procedures of each local jurisdiction. The plans should include a review of existing outdoor warning siren coverage and recommend new locations if and where there are coverage gaps. Seek funding to install new warning sirens in accordance with the plan recommendations. | |
|---|---|
| Category: | Emergency Services |
| Jurisdiction: | MultiJurisdictional |
| Hazard: | Multi-Hazard |
| Goal.Objective: | 1.3, 3.1, 3.2, 4.1, |
| Background / Benefit: | Some communities and rural areas of the county have older warning systems or none at all. To better serve the citizens of Leavenworth County, a study should be conducted to evaluate measures to be taken to improve overall emergency warning services. |
| Priority: | Moderate |
| Funding Sources: | Local / State / Federal |
| Responsibility Assigned to: | Leavenworth County Emergency Management / Emergency Services |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | Requires Funding |

## 5.2.2 Jurisdictional Actions

### Jurisdictional Actions

| Leavenworth (UnInc.) |
|---|

| 1. Develop a program to acquire and preserve parcels of land subject to repetitive flooding from willing and voluntary property owners. | |
|---|---|
| Category: | Property Protection |
| Jurisdiction: | Leavenworth (UnInc.) |
| Hazard: | Flood |
| Goal.Objective: | 1.1, 2.1, 3.1, 3.2, 4.1, |
| Background / Benefit: | Land acquisition is an effective mitigation technique to permanently eliminate the potential for damages from future flood events.<br>Leavenworth County can apply for grant funding to acquire flood-prone parcels of land from voluntary and willing property owners. |
| Priority: | High |
| Funding Sources: | FEMA, KDEM, Local |
| Responsibility Assigned to: | Planner |
| Target Completion Date: | Continuous |
| Cost of Action: | No Cost / Low Cost |

| 2. Regularly calculate and document the amount of flood prone property that is preserved as open space to reduce flood insurance burden to the county. | |
|---|---|
| Category: | Prevention |
| Jurisdiction: | Leavenworth (UnInc.) |
| Hazard: | Flood |
| Goal.Objective: | 1.1, 1.2, 2.1, 2.2, |
| Background / Benefit: | CRS credit is given for areas that are permanently preserved as open space. Although credit is not given for federal lands, the jurisdiction maintains floodplain areas preserved as open space through land acquisition projects (i.e., HMGP), which protect parcels from development through deed restrictions. The jurisdiction also has floodplain land within state parks or otherwise preserved as wildlife and natural preserves, which does qualify for additional CRS credit. |
| Priority: | High |
| Funding Sources: | N/A |
| Responsibility Assigned to: | Planner / Flood Plain Administrator |
| Target Completion Date: | Continuous |
| Cost of Action: | No Cost / Low Cost |

| 3. Identify flash-flood prone areas to consider flood reduction measures to county planners. | |
|---|---|
| Category: | Prevention |
| Jurisdiction: | Leavenworth (UnInc.) |
| Hazard: | Flood |
| Goal.Objective: | 1.1, 1.2, 2.1, |
| Background / Benefit: | Flood zone mapping will provide initial identification of potential hazard areas that can be reviewed with other data sources, such as the watershed districts goals and objectives, in developing long range planning activities for flash-flood prevention, or other planning steps to reduce exposure to this hazard. |
| Priority: | High |
| Funding Sources: | Local |
| Responsibility Assigned to: | Planner |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | No Cost / Low Cost |

| 4. Amend the Floodplain Management Ordinance to include a “no-rise (in base flood elevation)” clause for Leavenworth County. | |
|---|---|
| Category: | Prevention |
| Jurisdiction: | Leavenworth (UnInc.) |
| Hazard: | Flood |
| Goal.Objective: | 1.1, 2.1, 2.2, |
| Background / Benefit: | Many floodplain permitting systems, including those that meet National Flood Insurance Program standards, allow projects outside the floodway to increase base flood elevations by up to one foot. While this may not represent a significant increase for just one project, the cumulative impact of a number of projects in the same floodplain can be significant. By prohibiting any rise throughout the 100-year floodplain, a “no rise” clause ensures that the cumulative impact of multiple permitted projects will not cause flood elevations to rise to unacceptable levels. |
| Priority: | High |
| Funding Sources: | N/A |
| Responsibility Assigned to: | Planning Commission / Planner |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | No Cost / Low Cost |

| 5. Research and design an appropriate stream buffer ordinance to further protect the jurisdiction's water resources and to limit future flood damages adjacent to major waterways. | |
|---|---|
| Category: | Natural Resource Protection |
| Jurisdiction: | Leavenworth (UnInc.) |
| Hazard: | Flood |
| Goal.Objective: | 1.1, 2.1, 2.2, |
| Background / Benefit: | Riparian buffers serve as natural boundaries between local waterways and existing development and help protect resources by filtering pollutants, providing flood control, alleviating streambank erosion, mitigating stream warming, and providing room for lateral movement of the stream channel. Buffer widths can vary greatly depending upon stream channel size and the intended purpose of the buffer, but 50-100 feet is generally considered to be sufficient for purposes of bank stabilization and sediment control. Many communities require 200 feet for flood control purposes. Special consideration should be given to Stranger Creek, while exempting Leavenworth County's agricultural operations from buffer regulations. |
| Priority: | High |
| Funding Sources: | FEMA/State/Local |
| Responsibility Assigned to: | Planning Commission / Planner |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | No Cost / Low Cost |

| 6. Identify levee owners in the jurisdiction. | |
|---|---|
| Category: | Prevention |
| Jurisdiction: | Leavenworth (UnInc.) |
| Hazard: | Flood |
| Goal.Objective: | 1.1, 1.2, 3.2, 4.1, |
| Background / Benefit: | Early in the implementation of Flood Map Modernization (Map Mod), the Department of Homeland Security's Federal Emergency Management Agency (FEMA) recognized that the role of levees in flood risk reduction would be an important part of the efforts of Map Mod. Further, it was acknowledged that the condition of levees had not been assessed since they were originally mapped as providing base (1-percent-annual-chance) flood protection. Because of this, FEMA initiated a revised process to gain a better understanding of the actual flood risks for those citizens living and working behind levees nationwide. Often, documentation regarding levee design, accreditation, and the impacts on flood hazard mapping is outdated or missing altogether. Identifying levee owners and developing initiatives for certifying levees may help reduce overall risk to life and property in the community. |
| Priority: | High |
| Funding Sources: | Local |
| Responsibility Assigned to: | Planner/Emergency Management |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | No Cost / Low Cost |

| 7. Implement a study to determine the residual flood risk in levee-protected areas. | |
|---|---|
| Category: | Property Protection |
| Jurisdiction: | Leavenworth (UnInc.) |
| Hazard: | Flood |
| Goal.Objective: | 1.1, 1.2, 3.2, 4.1, |
| Background / Benefit: | Levee owners or communities have the responsibility to provide documentation that a levee meets the requirements of Title 44 of the Code of Federal Regulations, Section 65.10 of the national Flood Insurance Program regulations (44CFR Section 65.10), as part of a study/mapping project. Without the required documentation necessary to comply with 44 CFR Section 65.10, the area behind the levee will be re-delineated and mapped as Special Flood Hazard Area (SFHA) on the Digital Flood Insurance Rate Map (DFIRM). Procedure Memorandum No. 34 allows for the issuance of a deadline to the community for submitting the required documents. |
| Priority: | Moderate |
| Funding Sources: | Local |
| Responsibility Assigned to: | Planner |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | Requires Funding |

| 8. Identify the county's most at-risk critical facilities, and evaluate potential mitigation techniques for protecting each facility to the maximum extent possible. | |
|---|---|
| Category: | Property Protection |
| Jurisdiction: | Leavenworth (UnInc.) |
| Hazard: | Multi-Hazard |
| Goal.Objective: | 1.2, 3.1, 3.2, 4.1, |
| Background / Benefit: | A thorough evaluation of potential mitigation opportunities for Leavenworth County's critical facilities must still be completed. Currently, there is very little available data on these facilities. An inventory/database on critical facilities should be created and maintained by the county and shared with the Kansas Division of Emergency Management. This inventory should include information on the location and risk to each facility, and should also document any cost-effective mitigation techniques to consider when funding becomes available. |
| Priority: | Moderate |
| Funding Sources: | Local |
| Responsibility Assigned to: | Emergency Management |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | Requires Funding |

| 9. Conduct an inventory/survey for the county's emergency response services to identify any existing needs or shortfalls in terms of personnel, equipment or required resources. | |
|---|---|
| Category: | Emergency Services |
| Jurisdiction: | Leavenworth (UnInc.) |
| Hazard: | Multi-Hazard |
| Goal.Objective: | 1.2, 1.3, |
| Background / Benefit: | A survey should be completed in order to verify the county's current emergency services are adequate to protect public health and safety from most probable hazard events. Any identified needs or shortfalls should become documented and result in specific recommendations to the County Commission for emergency service enhancements. |
| Priority: | Moderate |
| Funding Sources: | Local/State |
| Responsibility Assigned to: | Emergency Management/GIS |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | Requires Funding |

| 10. Research, develop, and recommend an ordinance/resolution to require installation of tornado shelters for major manufactured and/or mobile home parks with more than 10 mobile home spaces. | |
|---|---|
| Category: | Property Protection |
| Jurisdiction: | Leavenworth (UnInc.) |
| Hazard: | Multi-Hazard |
| Goal.Objective: | 2.3, 2.4, |
| Background / Benefit: | Mobile homes are particularly vulnerable to damage from high winds. Residents, even those who live in mobile homes with tie-downs, should seek safe shelter when a tornado threatens. Tornado shelters should be constructed in major mobile home parks to ensure a safe place for residents to go during a tornado event. The shelter structure, which should be designed to withstand a minimum of 120mph winds, could easily serve an alternate purpose such as a community center, laundry facility, etc. Tornado shelters should be for last minute protection for high wind events. |
| Priority: | High |
| Funding Sources: | N/A |
| Responsibility Assigned to: | Planning and Zoning Department |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | No Cost / Low Cost |

| 11. Evaluate the firefighting water supply resources within the County. This should include both fixed and mobile supply issues. | |
|---|---|
| Category: | Emergency Services |
| Jurisdiction: | Leavenworth (UnInc.) |
| Hazard: | Wildfire |
| Goal.Objective: | 1.3, 1.4, |
| Background / Benefit: | Lack of sufficient water supply makes it difficult for firefighters to suppress fires. Whenever possible, increasing access to water along water service delivery lines (wet and dry hydrants) would provide additional resources for emergency responders. |
| Priority: | Moderate |
| Funding Sources: | Local |
| Responsibility Assigned to: | Fire Officials/ Emergency Managment |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | Requires Funding |

| 12. Distribute assessment report examples provided by the Kansas Forest Service to applicable parties to develop an understanding of the Community Wildfire Protection Plan (CWPP). Recommend joining the program and completing an assessment report for approval. | |
|---|---|
| Category: | Public Information and Awareness |
| Jurisdiction: | Leavenworth (UnInc.) |
| Hazard: | Wildfire |
| Goal.Objective: | 1.2, 1.4, 4.2, |
| Background / Benefit: | The probability of grass/cropland fire in Leavenworth County is relatively high. With over 58-years of history, the likelihood of future events is estimated to remain the same as currently calculated. Leavenworth County can expect an average of 11.03 significant wildfires per year that damage or destroy a total of 292.83 acres annually. The Kansas Forest Service staff would provide assistance to interested communities in the form of a Community Wildfire Hazard Assessment Report and some mitigation action items. |
| Priority: | High |
| Funding Sources: | Local/ State/ Federal grant programs |
| Responsibility Assigned to: | Rural Fire/ Emergency Management |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | No Cost / Low Cost |

| 13. Develop and implement a wildfire prevention/education program. In addition to providing education to the general public, the program should also target children, fire and equipment users, builders and developers, and homeowners. | |
|---|---|
| Category: | Public Information and Awareness |
| Jurisdiction: | Leavenworth (UnInc.) |
| Hazard: | Wildfire |
| Goal.Objective: | 1.4, 4.1, 4.2, |
| Background / Benefit: | Leavenworth County has burn-ban resolutions which require special permission to conduct open burning operations. In periods of drought or extreme weather conditions a burn ban may be declared. When a ban is declared all radio stations, TV stations, and regional newspapers in the area are notified as well as mayors, fire chiefs, etc. To better educate the public at large, Leavenworth County should expand their existing fire protection program to include wildfire workshops to all age groups and commercial operations. |
| Priority: | Moderate |
| Funding Sources: | Local |
| Responsibility Assigned to: | Fire Officials / Emergency Management |
| Target Completion Date: | Continuous |
| Cost of Action: | Requires Funding |

| 14. Examine the current agreements within the county and assess the need to expand or update cooperative agreements for firefighting resources. Include agreements with local, state and federal agencies. | |
|---|---|
| Category: | Emergency Services |
| Jurisdiction: | Leavenworth (UnInc.) |
| Hazard: | Wildfire |
| Goal.Objective: | 1.3, 1.4, |
| Background / Benefit: | Cooperative agreements provide the support needed in times of emergency, and are an important element of planning, with the long-range goal of reducing damage to structures and systems within the jurisdiction. |
| Priority: | High |
| Funding Sources: | Local |
| Responsibility Assigned to: | Fire Officials / Emergency Management |
| Target Completion Date: | Continuous |
| Cost of Action: | No Cost / Low Cost |

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| 15. Appoint a rural fire committee to schedule meetings with the Kansas Forest Service to map suspected hazardous wildfire areas in the county for potential participation in the Community Wildfire Protection Program (CWPP). | |
|---|---|
| Category: | Prevention |
| Jurisdiction: | Leavenworth (UnInc.) |
| Hazard: | Wildfire |
| Goal.Objective: | 1.4, 4.1, |
| Background / Benefit: | In order for a community to take advantage of the Community based Healthy forests Restoration Act (HFRA), 2003, a community must develop a Community Wildfire Protection Plan (CWPP). To develop qualifications the community must identify and map potential hazard areas as an initial step towards participation in the program. |
| Priority: | Moderate |
| Funding Sources: | Local/State/Federal |
| Responsibility Assigned to: | Rural Fire/ Emergency Management |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | Requires Funding |

| 16. Incorporate wildfire maps, develop actions and projects for wildfire prevention, and complete an assessment report to meet CWPP requirements for submittal to the Kansas Forest Service. | |
|---|---|
| Category: | Prevention |
| Jurisdiction: | Leavenworth (UnInc.) |
| Hazard: | Wildfire |
| Goal.Objective: | 1.2, 1.4, 4.1, 4.2, |
| Background / Benefit: | The minimum requirements participation in the CWPP as described in the HFRA are: (1) Collaboration: A CWPP must be collaboratively developed by local and state government representatives, in consultation with federal agencies and other interested parties. (2) Prioritized Fuel Reduction: A CWPP must identify and prioritize areas for hazardous fuel reduction treatments and recommend the types and methods of treatment that will protect one or more at-risk communities and essential infrastructure. (3) Treatment of Structural Ignitability: A CWPP must recommend measures that homeowners and communities can take to reduce the ignitability of structures throughout the area addressed by the plan. |
| Priority: | Moderate |
| Funding Sources: | Local/State/Federal |
| Responsibility Assigned to: | Rural Fire/ Emergency Management |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | Requires Funding |

| 17. Develop cross-departmental information collection capabilities, and incorporate cadastral (building/parcel) data utilizing a GIS for purposes of conducting more detailed hazard risk assessments and for tracking permitting / land use patterns, buildings and infrastructure replacement costs, and overall structural accounting for the county. | |
|---|---|
| Category: | Prevention |
| Jurisdiction: | Leavenworth (UnInc.) |
| Hazard: | Multi-Hazard |
| Goal.Objective: | 1.2, |
| Background / Benefit: | A comprehensive catalog of data can greatly enhance the county's technical capability to manage, analyze and display spatially referenced data. Leavenworth County has GIS capabilities available through the Leavenworth GIS Department. Further development of this capability for functional use across all departments will enhance the county's overall capabilities to document building/structure cost data, and further hazard mitigation goals in developing cadastral data for the county. |
| Priority: | Moderate |
| Funding Sources: | KDEM, Local, and grants |
| Responsibility Assigned to: | Emergency Management / County GIS Department |
| Target Completion Date: | Continuous |
| Cost of Action: | Requires Funding |

| 18. Develop an annex to the Local Emergency Operations Plan (LEOP) for dam/levee failure response and evacuation plans for high hazard dams/levees in Leavenworth County. | |
|---|---|
| Category: | Property Protection |
| Jurisdiction: | Leavenworth (UnInc.) |
| Hazard: | Dam/Levee |
| Goal.Objective: | 1.1, 2.1, |
| Background / Benefit: | Leavenworth County has 221 dams in the county that are regulated by the Kansas Department of Agriculture, Water Resources Department. Seven of these structures are classified as “High Hazard Class C” structures, and are owned by various private, State, and Federal agencies. The State evaluation of the dams is based on location in areas where failure may cause extensive loss of life, serious damage to homes, industrial and commercial facilities, important public utilities, main highways or railroads. It is important to note that a high hazard dam is not necessarily unsafe, as defined by the State of Kansas. An individual dam’s hazard classification is based upon the potential consequences of dam failure and does not reflect the physical condition of the dam. Preparing for a potential emergency is an essential planning step to secure the people and property downstream from a potential breach or dam failure. There are also an estimated 48 levees reported in the county, of which four (4) are owned by the county. Ownership for the remaining levees is listed as unknown. |
| Priority: | High |
| Funding Sources: | Local |
| Responsibility Assigned to: | Emergency Management Department |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | No Cost / Low Cost |

| 19. Seek funding to complete a stormwater drainage study for Leavenworth County that will lead to a stormwater management ordinance that maintains pre-development runoff rates. The study should include an evaluation of existing dams/levee systems, vulnerable streams, and other major waterways in the county that may impact growth patterns established for the county. | |
|---|---|
| Category: | Prevention |
| Jurisdiction: | Leavenworth (UnInc.) |
| Hazard: | Flood |
| Goal.Objective: | 1.1, 1.2, 2.1, 2.2, |
| Background / Benefit: | Stormwater management best practices for Leavenworth are addressed in the Leavenworth County Land Use Plan. According to the Plan, guidance is to protect environmentally sensitive land and maintain open space, and adopting a stream setback policy for all new developments. A stormwater drainage study/plan will identify drainage problems and address solutions through detention, retention, and drainage system maintenance among other specific mitigation measures. |
| Priority: | Moderate |
| Funding Sources: | State of Kansas/ FEMA |
| Responsibility Assigned to: | Planner |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | Requires Funding |

| 20. Research and contact all owners of high hazard dams in the county, and inform them of their responsibility to provide Emergency Action Plans to the Leavenworth County Emergency Management as prescribed by the Kansas Department of Agriculture – Water Resources Division, Chief Engineer. Additionally, Levee owners should be contacted regarding potential PM 43 requirements for continued validation of protected areas behind the levees. | |
|---|---|
| Category: | Emergency Services |
| Jurisdiction: | Leavenworth (UnInc.) |
| Hazard: | Dam/ Levee Failure |
| Goal.Objective: | 1.1, 2.1, |
| Background / Benefit: | Leavenworth County has 221 dams in the county that are regulated by the Kansas Department of Agriculture, Water Resources Department. Seven of these structures are classified as “High Hazard” structures. These seven dams should have Emergency Action Plans on file with emergency management for the protection of life and property downstream of these structures. The State evaluation of the dams is based on location in areas where failure may cause extensive loss of life, serious damage to homes, industrial and commercial facilities, important public utilities, main highways or railroads. It is important to note that a classification as “High Hazard” is not necessarily unsafe, as defined by the State of Kansas. An individual dam or levee hazard classification is based upon the potential consequences of dam failure and does not reflect the physical condition of the dam. Preparing for a potential emergency is an essential planning step to secure the people and property downstream from a potential breach or dam failure. Approximately 48 levees were identified in Leavenworth County. Certifications are unknown at the time of this Plan. |
| Priority: | High |
| Funding Sources: | Local |
| Responsibility Assigned to: | Emergency Management Department |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | No Cost / Low Cost |

| 21. Research and recommend appropriate building codes for the Jurisdiction that includes wind-resistant design techniques for new construction. | |
|---|---|
| Category: | Property Protection |
| Jurisdiction: | Leavenworth (UnInc.) |
| Hazard: | Multi-Hazard |
| Goal.Objective: | 2.3, |
| Background / Benefit: | Currently, Leavenworth County does not have any building code requirements. Incorporated and unincorporated areas of the county should adopt and enforce codes that require certain minimum building practices and contractor licensing for wind loss reduction. Experts agree that structures built to exceed high wind provisions have a much greater chance of surviving violent windstorms. Additional techniques include adding protection for windows (i.e., shutters), anchoring door frames with multiple hinges, stiffening garage doors with additional bracing, reinforcing masonry chimneys with vertical steel, and strengthening connections between walls and the roof with hurricane straps and ties. These techniques should be promoted to building contractors and homebuyers by the county for all new residential construction, to the maximum extent possible during the building permit process. |
| Priority: | High |
| Funding Sources: | Local |
| Responsibility Assigned to: | Planning Commission / Planner |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | No Cost / Low Cost |

| 22. Establish a local reserve fund to augment the Leavenworth County GIS Department's ability to monitor building trends and erosion patterns across the county through frequent aerial photography. | |
|---|---|
| Category: | Public Information and Awareness |
| Jurisdiction: | Leavenworth (UnInc.) |
| Hazard: | Flood |
| Goal.Objective: | 1.1, 1.2, |
| Background / Benefit: | Utilization of GIS capabilities should be expanded to include monitoring of county topography and water erosion changes a minimum of four times a year. This frequency will allow development of additional GIS layers for future planning, and also assist in identifying mitigation of potential problem areas before they become a major issue for the county. |
| Priority: | Moderate |
| Funding Sources: | Local/State/Federal |
| Responsibility Assigned to: | County GIS |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | Requires Funding |

| 23. Establish a local reserve fund to develop and support an interactive GIS webpage for the general public. | |
|---|---|
| Category: | Public Information and Awareness |
| Jurisdiction: | Leavenworth (UnInc.) |
| Hazard: | Multi-Hazard |
| Goal.Objective: | 4.1, |
| Background / Benefit: | Development and implementation of a county interactive webpage would provides real-time GIS data that will provide an effective training tool, as well as education references for home school, and research activities. |
| Priority: | Moderate |
| Funding Sources: | Local/State/Federal |
| Responsibility Assigned to: | Leavenworth County GIS |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | Requires Funding |

| 24. The Big Stranger Drainage District will continue the care and maintenance, including debris removal, of the portion of the Big Stranger Creek that is located within the Drainage District. | |
|---|---|
| Category: | Property Protection |
| Jurisdiction: | Leavenworth (UnInc.) |
| Hazard: | Multi-Hazard |
| Goal.Objective: | 1.1, 1.2, |
| Background / Benefit: | The Big Stranger Drainage District contains 16,730 acres within Leavenworth County. The general mission of the drainage district is to see that the Big Stranger Creek is free of of debris on the portion of the creek that is located within the Drainage District. The organization will evaluate the need for further maintenance projects, and additional effort will be made to seek alternative funding as they become available. |
| Priority: | Moderate |
| Funding Sources: | Local / State / Federal |
| Responsibility Assigned to: | Big Stranger Drainage District |
| Target Completion Date: | Continuous |
| Cost of Action: | Requires Funding |

| 25. The Leavenworth County Consolidated Rural Water District (RWD) No. 1 will continue to assess the impact of natural hazards on water distribution lines, systems, and equipment. The Water District will also seek funding sources to mitigate damage to critical infrastructure, and seek funding for various water main improvement projects. | |
|---|---|
| Category: | Property Protection |
| Jurisdiction: | Leavenworth (UnInc.) |
| Hazard: | Multi-Hazard |
| Goal.Objective: | 1.2, 3.2, |
| Background / Benefit: | The Leavenworth County Consolidated RWD No. 1 provides potable water to their customers in Leavenworth County. Maintaining an adequate, quality water supply to their customers is the district's top priority. |
| Priority: | Moderate |
| Funding Sources: | Local / State / Federal |
| Responsibility Assigned to: | Leavenworth County Consolidated RWD No. 1 |
| Target Completion Date: | Continuous |
| Cost of Action: | Requires Funding |

| 26. Maintain, repair, and collect GPS locations of fire hydrants within the Leavenworth County area served by Leavenworth County Rural Water District (RWD) 7. | |
|---|---|
| Category: | Emergency Services |
| Jurisdiction: | Leavenworth (UnInc.) |
| Hazard: | Wildfire |
| Goal.Objective: | 1.2, 1.3, 1.4, 4.1, |
| Background / Benefit: | Currently, there is no GIS mapping of the fire hydrants located within the Leavenworth RWD 7 boundaries. The maintenance and repair, as well as the GPS mapping of the fire hydrant locations, could benefit response time of the applicable fire departments serving the areas. |
| Priority: | Moderate |
| Funding Sources: | Local / State / Federal |
| Responsibility Assigned to: | Rural Fire Departments and Leavenworth County RWD 7 |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | Requires Funding |

| 27. The Leavenworth County Rural Water District (RWD) No. 7 will continue to assess the impact of natural hazards on water distribution lines, systems, and equipment. The Water District will also seek funding sources to mitigate damage to critical infrastructure, and seek funding for various water main improvement projects. | |
|---|---|
| Category: | Property Protection |
| Jurisdiction: | Leavenworth (UnInc.) |
| Hazard: | Multi-Hazard |
| Goal.Objective: | 1.2, 3.2, |
| Background / Benefit: | The Leavenworth County RWD No. 7 provides potable water to their customers in Leavenworth County. Maintaining an adequate, quality water supply to their customers is the district's top priority. |
| Priority: | Moderate |
| Funding Sources: | Local / State / Federal |
| Responsibility Assigned to: | Leavenworth County RWD 7 |
| Target Completion Date: | Continuous |
| Cost of Action: | Requires Funding |

| 28. Obtain funding for the purchase of mobile backup power generators for the groundwater well facilities of Leavenworth County Rural Water District (RWD) 7. | |
|---|---|
| Category: | Prevention |
| Jurisdiction: | Leavenworth (UnInc.) |
| Hazard: | Multi-Hazard |
| Goal.Objective: | 3.1, 3.2, |
| Background / Benefit: | Leavenworth County RWD 7 has identified a need to quickly restore power in its groundwater well facilities in the event of a weather event and the subsequent loss of power. |
| Priority: | Moderate |
| Funding Sources: | Local / State / Federal |
| Responsibility Assigned to: | Leavenworth County RWD 7 |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | Requires Funding |

| 29. Suburban Water, Inc. will seek funding to prepare a written Emergency Operations Plan to be used as a resource during the initial response to an emergency event and provide guidance until all operations affected are back to normal operation. | |
|---|---|
| Category: | Emergency Services |
| Jurisdiction: | Leavenworth (UnInc.) |
| Hazard: | Multi-Hazard |
| Goal.Objective: | 1.2, 3.2, |
| Background / Benefit: | Suburban Water, Inc. has identified the need to have an Emergency Operations Plan prepared in anticipation of emergency response. |
| Priority: | Moderate |
| Funding Sources: | Local / State / Federal |
| Responsibility Assigned to: | Suburban Water, Inc. |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | Requires Funding |

| 30. Suburban Water, Inc. will continue to assess the impact of natural hazards on its water supplies, distribution and transmission systems, storage facilities, structures and equipment. Suburban Water, Inc. will also seek funding sources to mitigate damage to critical infrastructure, and seek funding for various water main improvement projects to enhance reliability of service. | |
|---|---|
| Category: | Prevention |
| Jurisdiction: | Leavenworth (UnInc.) |
| Hazard: | Multi-Hazard |
| Goal.Objective: | 1.2, 3.2, |
| Background / Benefit: | Suburban Water, Inc. provides potable water to its customers which are located in southern Leavenworth County. Providing a safe, reliable, and high quality water supply to all present and future customers is Suburban Water's top priority. |
| Priority: | Moderate |
| Funding Sources: | Local / State / Federal |
| Responsibility Assigned to: | Suburban Water, Inc. |
| Target Completion Date: | Continuous |
| Cost of Action: | Requires Funding |

| 31. Suburban Water, Inc. will continue to enhance the reliability of its supervisory control and data acquisition (SCADA) system used to monitor the supply of water throughout its distribution system. Suburban Water, Inc. will also seek funding sources to further expand the capabilities of its SCADA system. | |
|---|---|
| Category: | Prevention |
| Jurisdiction: | Leavenworth (UnInc.) |
| Hazard: | Multi-Hazard |
| Goal.Objective: | 1.2, 3.2, |
| Background / Benefit: | Suburban Water, Inc. has identified a need to expand the capabilities of its current SCADA system. |
| Priority: | Moderate |
| Funding Sources: | Local / State / Federal |
| Responsibility Assigned to: | Suburban Water, Inc. |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | Requires Funding |

| 32. Suburban Water, Inc. will continue to pursue opportunities to establish interconnections with the City of Leavenworth Water Department, Rural Water District No. 7 of Leavenworth County, and Rural Water District No. 9 of Leavenworth County, to enhance the reliability of their water supplies. Suburban Water, Inc. will also seek funding to establish the interconnections. | |
|---|---|
| Category: | Prevention |
| Jurisdiction: | Leavenworth (UnInc.) |
| Hazard: | Multi-Hazard |
| Goal.Objective: | 1.2, 3.2, |
| Background / Benefit: | Suburban Water, Inc. has identified a need to establish interconnections with other water suppliers in an attempt to enhance the reliability of the water supply in Leavenworth County. |
| Priority: | Moderate |
| Funding Sources: | Local / State / Federal |
| Responsibility Assigned to: | Suburnban Water, Inc. |
| Target Completion Date: | Continuous |
| Cost of Action: | Requires Funding |

| 33. Suburban Water, Inc. will seek funding to improve the reliability of its water supply from the Board of Public Utility (BPU) of Kansas City, Kansas. | |
|---|---|
| Category: | Prevention |
| Jurisdiction: | Leavenworth (UnInc.) |
| Hazard: | Multi-Hazard |
| Goal.Objective: | 1.2, 3.2, |
| Background / Benefit: | Suburban Water, Inc. has identified a need to improve the reliability of its water supply through the BPU. |
| Priority: | Moderate |
| Funding Sources: | Local / State / Federal |
| Responsibility Assigned to: | Suburban Water, Inc. |
| Target Completion Date: | Continuous |
| Cost of Action: | Requires Funding |

| 34. Suburban Water, Inc. will seek funding to complete hydrogeological studies and investigations for the purpose of seeking to find additional reliable water sources. | |
|---|---|
| Category: | Prevention |
| Jurisdiction: | Leavenworth (UnInc.) |
| Hazard: | Multi-Hazard |
| Goal.Objective: | 1.2, 3.2, |
| Background / Benefit: | Suburban Water, Inc. has identified a need to find additional reliable water sources for its customers in Leavenworth County. |
| Priority: | Moderate |
| Funding Sources: | Local / State / Federal |
| Responsibility Assigned to: | Suburban Water, Inc. |
| Target Completion Date: | Continuous |
| Cost of Action: | Requires Funding |

| 35. Suburban Water, Inc. will seek funding to develop and establish backup electric power supplies at pumping stations in case of primary power outages. | |
|---|---|
| Category: | Prevention |
| Jurisdiction: | Leavenworth (UnInc.) |
| Hazard: | Multi-Hazard |
| Goal.Objective: | 3.1, 3.2, |
| Background / Benefit: | Suburban Water, Inc. has identified a need to quickly restore power in its pumping stations in the event of a weather event and the subsequent loss of power. |
| Priority: | Moderate |
| Funding Sources: | Local / State / Federal |
| Responsibility Assigned to: | Suburban Water, Inc. |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | Requires Funding |

| 36. Suburban Water, Inc. will seek funding to develop a secure and protected structure at its headquarters to allow continuous operations during natural disasters. | |
|---|---|
| Category: | Property Protection |
| Jurisdiction: | Leavenworth (UnInc.) |
| Hazard: | Multi-Hazard |
| Goal.Objective: | 3.1, 3.2, |
| Background / Benefit: | Suburban Water, Inc. identified a need to develop a secure and protected structure at its headquarters to allow continuous operations during natural disasters. |
| Priority: | Moderate |
| Funding Sources: | Local / State / Federal |
| Responsibility Assigned to: | Suburban Water, Inc. |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | Requires Funding |

| 37. Suburban Water, Inc. will seek funding to enhance the protection to existing water mains at creek crossings (flood plains). | |
|---|---|
| Category: | Property Protection |
| Jurisdiction: | Leavenworth (UnInc.) |
| Hazard: | Flood |
| Goal.Objective: | 1.1, 3.1, |
| Background / Benefit: | Suburban Water, Inc. identified a need to enhance the protection to existing water mains at creek crossings that are located within flood plains. |
| Priority: | Moderate |
| Funding Sources: | Local / State / Federal |
| Responsibility Assigned to: | Suburban Water, Inc. |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | Requires Funding |

| 38. The Leavenworth Water Department will continue to assess the impact of natural hazards on water distribution lines, systems, and equipment. The Department will also seek additional funding sources to mitigate damage to critical infrastructure. | |
|---|---|
| Category: | Property Protection |
| Jurisdiction: | Leavenworth (UnInc.) |
| Hazard: | Multi-Hazard |
| Goal.Objective: | 1.2, 3.2, |
| Background / Benefit: | The Leavenworth Water Department provides potable water to their customers throughout Leavenworth County, encompassing approximately 55,000 residents. The Department's facilities also includes approximately 180 miles of water transmission and distribution lines, pumping stations, well field, and five million gallons of potable water storage. |
| Priority: | Moderate |
| Funding Sources: | Local / State / Federal |
| Responsibility Assigned to: | Leavenworth Water Department / Leavenworth County (Uninc.) |
| Target Completion Date: | Continuous |
| Cost of Action: | Requires Funding |

| 39. Coordinate county and local government mitigation efforts with Rural Electric Cooperatives (REC's), encourage identification of hazards potentially affecting their infrastructure, assessment of the vulnerabilities of the infrastructure to these hazards, and identification of mitigation strategies. | |
|---|---|
| Category: | Property Protection |
| Jurisdiction: | Leavenworth (UnInc.) |
| Hazard: | Utility Failure |
| Goal.Objective: | 3.2, |
| Background / Benefit: | Long-term planning goals that will reduce exposure to loss of electrical power are beneficial to all organizations and citizens within the jurisdiction. Power loss during extreme periods of cold or heat increase damage potential to people and property. |
| Priority: | Moderate |
| Funding Sources: | N/A |
| Responsibility Assigned to: | City / County Planners / RECs |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | Requires Funding |

| |
|---|
| Basehor |

| 1. Identify flash-flood prone areas to consider flood reduction measures to city/county planners. | |
|---|---|
| Category: | Prevention |
| Jurisdiction: | Basehor |
| Hazard: | Flood |
| Goal.Objective: | 1.1, 2.1, |
| Background / Benefit: | Flood zone mapping has provided initial identification of potential hazard areas that can be reviewed with other data sources, such as the watershed districts goals and objectives, in developing long range planning activities for flood prevention, or other planning steps to reduce exposure to this hazard. |
| Priority: | High |
| Funding Sources: | Local |
| Responsibility Assigned to: | City Planner / Floodplain Manager |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | No Cost / Low Cost |

| 2. Incorporate the inspection and management of trees into the city maintenance program that may pose a threat to the electrical lines that could result in power outages during ice storms. | |
|---|---|
| Category: | Prevention |
| Jurisdiction: | Basehor |
| Hazard: | Ice Storm |
| Goal.Objective: | 1.3, 3.1, 3.2, |
| Background / Benefit: | Significant amounts of property damage occur during ice storms that result from tree failure. Trees that fall into utility lines have additional serious consequences such as causing power outages, surges, fires and other damage. The jurisdiction's ability to recognize and prevent hazardous tree conditions (through inspection, pruning or removal) is the best defense against problems and costly damages resulting from tree failure. Specifically, trees located on jurisdictional property, which pose immediate threats to property, utility lines and other critical facilities should be addressed. |
| Priority: | Moderate |
| Funding Sources: | Local / State / Federal |
| Responsibility Assigned to: | City of Basehor |
| Target Completion Date: | Continuous |
| Cost of Action: | Requires Funding |

| 3. Determine the efficacy of the existing generators located within Critical Facility structures, including the City Hall / Police Department, and consider funding options for any Critical Facilities that may require generators and/or transfer switches to maintain power in the event of severe weather events. | |
|---|---|
| Category: | Prevention |
| Jurisdiction: | Basehor |
| Hazard: | Multi-Hazard |
| Goal.Objective: | 1.3, 3.1, 3.2, |
| Background / Benefit: | Ensure that Critical Facilities located within the City of Basehor maintain power during severe weather events. |
| Priority: | Moderate |
| Funding Sources: | Local / State / Federal |
| Responsibility Assigned to: | City of Basehor |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | Requires Funding |

| 4. Seek funding to retain an engineer to design a safe room within the City of Basehor City Hall / Police Department and apply for grant funding for construction of the safe room within the new facility when constructed. | |
|---|---|
| Category: | Structural Projects |
| Jurisdiction: | Basehor |
| Hazard: | Multi-Hazard |
| Goal.Objective: | 2.4, 3.1, |
| Background / Benefit: | A lack of safe rooms poses a serious risk to the community. The City of Basehor has identified a need for a safe room within the Basehor City Hall / Police Department when constructed. |
| Priority: | Moderate |
| Funding Sources: | Local / State / Federal |
| Responsibility Assigned to: | City of Basehor |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | Requires Funding |

| 5. Develop a radio communications plan between the City of Basehor Public Works Department / Street Department and City Hall to ensure interoperability between entities. The communications plan should address equipment compatibility and upgrade requirements to implement the plan. | |
|---|---|
| Category: | Emergency Services |
| Jurisdiction: | Basehor |
| Hazard: | Multi-Hazard |
| Goal.Objective: | 1.3, 4.1, |
| Background / Benefit: | The City of Basehor has identified a need to implement interoperable radio communications between the Public Works Department / Street Department and City Hall. |
| Priority: | Moderate |
| Funding Sources: | Local / State / Federal |
| Responsibility Assigned to: | City of Basehor |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | Requires Funding |

| 6. Seek funding options for the purchase of a brine applicator and mixer to apply chemicals to roads within the City of Basehor prior to major winter storm events, including ice storms. | |
|---|---|
| Category: | Emergency Services |
| Jurisdiction: | Basehor |
| Hazard: | Multi-Hazard |
| Goal.Objective: | 1.3, 3.2, |
| Background / Benefit: | The City of Basehor has identified a need for a brine applicator and mixer to assist in maintaing safe roads within the city during major winter storm events. |
| Priority: | Moderate |
| Funding Sources: | Local / State / Federal |
| Responsibility Assigned to: | City of Basehor |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | Requires Funding |

| 7. Seek funding options for the purchase of equipment to assist in the removal of debris and assist with cleanups after major storms. | |
|---|---|
| Category: | Emergency Services |
| Jurisdiction: | Basehor |
| Hazard: | Multi-Hazard |
| Goal.Objective: | 1.3, 3.1, 3.2, 4.1, |
| Background / Benefit: | The City of Basehor has identified the need for equipment to be utilized in the removal of debris and cleanup after major storms within the city limits. Equipment needed includes a Case 580 Super M Series 3 4x4 extended backhoe with grapple bucket; a Polaris Ranger 800 HD utility vehicle; and a 2010 F-450 Ford 4x4 diesel truck with dump bed. |
| Priority: | Moderate |
| Funding Sources: | Local / State / Federal |
| Responsibility Assigned to: | City of Basehor |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | Requires Funding |

| Easton |
|---|

| 1. Identify flash-flood prone areas to consider flood reduction measures to city officials / county planners. | |
|---|---|
| Category: | Prevention |
| Jurisdiction: | Easton |
| Hazard: | Flood |
| Goal.Objective: | 1.1, 2.1, |
| Background / Benefit: | Flood zone mapping has provided initial identification of potential hazard areas that can be reviewed with other data sources, such as the watershed districts goals and objectives, in developing long range planning activities for flood prevention, or other planning steps to reduce exposure to this hazard. |
| Priority: | High |
| Funding Sources: | Local |
| Responsibility Assigned to: | City of Easton |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | No Cost / Low Cost |

| 2. Seek funding to raise the casings around the potable water wells utilized by the City of Easton to protect them from flood water contamination. | |
|---|---|
| Category: | Prevention |
| Jurisdiction: | Easton |
| Hazard: | Flood |
| Goal.Objective: | 1.1, 1.2, 2.1, 4.1, |
| Background / Benefit: | The City of Easton has historically experienced flooding events that have, on occasion, resulted in potable water contamination due to flood waters impacting the water wells utilized by the City of Easton. |
| Priority: | Moderate |
| Funding Sources: | Local / State / Federal |
| Responsibility Assigned to: | City of Easton |
| Target Completion Date: | December 31, 2012 |
| Cost of Action: | Requires Funding |

| 3. Consider funding options for the purchase and installation of a backup generator for the City of Easton Water Treatment Plant in the event of severe weather events. | |
|---|---|
| Category: | Prevention |
| Jurisdiction: | Easton |
| Hazard: | Multi-Hazard |
| Goal.Objective: | 1.2, 1.3, 3.1, 3.2, |
| Background / Benefit: | The City of Easton has identified a need to ensure that the Water Treatment Plant in Easton maintain power during severe weather events, to ensure the quality of the water supplied to the city. |
| Priority: | High |
| Funding Sources: | Local / State / Federal |
| Responsibility Assigned to: | City of Easton |
| Target Completion Date: | December 31, 2012 |
| Cost of Action: | |

| 4. Consider funding options for the purchase and installation of control valves for the City of Easton Water Treatment Plant and storage facility in the event of flooding events. | |
|---|---|
| Category: | Prevention |
| Jurisdiction: | Easton |
| Hazard: | Flood |
| Goal.Objective: | 1.2, 1.3, 3.1, 3.2, |
| Background / Benefit: | The City of Easton has identified a need to protect the potable water supply system from flooding events between the city water treatment plant and storage facility. There is a concern of contaminates from flooding resting in the supply line. |
| Priority: | Moderate |
| Funding Sources: | Local / State / Federal |
| Responsibility Assigned to: | City of Easton |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | Requires Funding |

| 5. Reduce danger and damage from repetitive flooding events, as well as allowing possible annexation of the City of Easton, by developing a program to acquire residential and commercial properties in coordination with FEMA acquisition programs. | |
|---|---|
| Category: | Property Protection |
| Jurisdiction: | Easton |
| Hazard: | Flood |
| Goal.Objective: | 1.1, 1.2, 2.1, |
| Background / Benefit: | There has been a history of repetitive flooding of residential and commercial buildings in the City of Easton. Flooding events occur in the area due to a sustained duration of high-intensity rainfall and to elevated water levels of the Stranger Creek and Dawson Creek . This has caused significant danger to both residents and emergency personnel, as well as damage to homes and businesses. There are 17 structures identified on the Repetitive Loss Properties list for the City of Easton and are reported to have flood insurance. Two of the structures were identified as having been mitigated. In total, 28 residents of the City of Easton have flood insurance with coverage of $3,550,000. The City of Easton has had 111 claims since 1978 totaling $1,461,919. |
| Priority: | Moderate |
| Funding Sources: | Local / State / Federal |
| Responsibility Assigned to: | City of Easton |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | Requires Funding |

| 6. Seek funding to retain an engineer to design community tornado shelters and apply for grant funding for construction. | |
|---|---|
| Category: | Structural Projects |
| Jurisdiction: | Easton |
| Hazard: | Tornado |
| Goal.Objective: | 2.4, 3.1, |
| Background / Benefit: | A lack of tornado shelters poses a serious risk to the safety of the community. The City of Easton has identified a need for Community Storm Shelters. |
| Priority: | Moderate |
| Funding Sources: | Local / State / Federal |
| Responsibility Assigned to: | City of Easton |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | Requires Funding |

| 7. Conduct an engineering study, in association with the State of Kansas, to examine the feasibility of raising the State highway 300 yards east of First Street to the twin bridges over Stranger Creek. | |
|---|---|
| Category: | Structural Projects |
| Jurisdiction: | Easton |
| Hazard: | Flooding |
| Goal.Objective: | 1.1, 1.2, 2.1, 3.2, 4.1, |
| Background / Benefit: | The City of Easton has historically experienced flooding events, often resulting in the flooding of the State Highway leading in and out of the city, leaving residents and commercial without an egress to the city, resulting in economic loss to the community. The relocation of the State Highway to the twin bridges over Stranger Creek would allow residents and commercial commodities to travel through the community during flooding events. |
| Priority: | Moderate |
| Funding Sources: | Local / State / Federal |
| Responsibility Assigned to: | City of Easton / Leavenworth County / State of Kansas |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | Requires Funding |

| Lansing |
|---|

| 1. Identify flash-flood prone areas to consider flood reduction measures to city planners. | |
|---|---|
| Category: | Prevention |
| Jurisdiction: | Lansing |
| Hazard: | Flood |
| Goal.Objective: | 1.1, 2.1, |
| Background / Benefit: | Flood zone mapping has provided initial identification of potential hazard areas that can be reviewed with other data sources, such as the watershed districts goals and objectives, in developing long range planning activities for flood prevention, or other planning steps to reduce exposure to this hazard. |
| Priority: | High |
| Funding Sources: | Local |
| Responsibility Assigned to: | Public Works Department / Floodplain Manager |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | No Cost / Low Cost |

| 2. Research funding options to construct storm shelters for existing mobile home parks in the City of Lansing that currently do not have storm shelters or have inadequate storm shelters. | |
|---|---|
| Category: | Property Protection |
| Jurisdiction: | Lansing |
| Hazard: | Multi-Hazard |
| Goal.Objective: | 2.4, 3.1, |
| Background / Benefit: | Mobile homes are particularly vulnerable to damage from high winds. Residents, even those who live in mobile homes with tie-downs, should seek safe shelter when a tornado threatens. Tornado shelters should be constructed in major mobile home parks to ensure a safe place for residents to go during a tornado event. The shelter structure, which should be designed to withstand a minimum of 120mph winds, could easily serve an alternate purpose such as a community center, laundry facility, etc. Tornado shelters should be for last minute protection for high wind events. Mobile Home Courts that currently do not have storm shelters or have inadequate storm shelters were identified as Wiley Mobile Home Court, Clear Creek Court, Black's Mobile Home Court, and Parkwood Court Manufactured Home Court. |
| Priority: | Moderate |
| Funding Sources: | Local / State / Federal |
| Responsibility Assigned to: | Planning and Zoning Department |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | Requires Funding |

| 3. Develop and fund professional services to augment the City of Lansing's GIS capability to provide condition investigation, analysis of streamways, develop stream buffer mapping, provide updated 2 ft. interval hypsography for the entire Lansing growth area to allow for improved storm water modeling and management, draft a stream buffer zoning ordinance for the city, produce digital 2 ft. contour mapping for use in storm water analysis and planning, and develop interactive floodplain and property parcel GIS application and database for use by city staff. | |
|---|---|
| Category: | Public Information and Awareness |
| Jurisdiction: | Lansing |
| Hazard: | Flood |
| Goal.Objective: | 1.1, 1.2, 4.1, |
| Background / Benefit: | Utilization of GIS capabilities should be expanded to include the use of ArcInfo and AutoCad format for various flood-related projects throughout the City of Lansing and the Lansing Growth Area. |
| Priority: | Moderate |
| Funding Sources: | Local / State / Federal |
| Responsibility Assigned to: | City of Lansing GIS Department |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | Requires Funding |

| 4. Conduct engineering studies for design and construction of levees to protect several areas within the Lansing city limits from flooding events. | |
|---|---|
| Category: | Property Protection |
| Jurisdiction: | Lansing |
| Hazard: | Dam / Levee |
| Goal.Objective: | 1.1, 1.2, 3.1, |
| Background / Benefit: | The City of Lansing has identified a need for the construction of levees to protect the Rock Creek West/Rock Creek West #5 neighborhood and the Fawn Valley Replat neighborhood from flooding events. |
| Priority: | Moderate |
| Funding Sources: | Local / State / Federal |
| Responsibility Assigned to: | City of Lansing |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | Requires Funding |

| 5. Conduct engineering studies for the design and reconstruction of an engineered storm water channel within the city limits of Lansing. | |
|---|---|
| Category: | Prevention |
| Jurisdiction: | Lansing |
| Hazard: | Flood |
| Goal.Objective: | 1.1, 1.2, 3.1, |
| Background / Benefit: | The City of Lansing has identified the need for design and reconstruction of the engineered storm water channel located in the Holiday Hills neighborhood. |
| Priority: | Moderate |
| Funding Sources: | Local / State / Federal |
| Responsibility Assigned to: | City of Lansing Public Works Department |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | Requires Funding |

| 6. Research and fund engineering services for a city-wide storm water infrastructure-needs assessment. | |
|---|---|
| Category: | Prevention |
| Jurisdiction: | Lansing |
| Hazard: | Flood |
| Goal.Objective: | 1.1, 1.2, 3.1, 3.2, |
| Background / Benefit: | The City of Lansing has identified the need for professional services to perform a storm water infrastructure needs assessment throughout the City of Lansing. |
| Priority: | Moderate |
| Funding Sources: | Local / State / Federal |
| Responsibility Assigned to: | City of Lansing Public Works Department |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | Requires Funding |

| 7. Research funding options for professional services and construction of stream bank stablization on Nine Mile Creek and Seven Mile Creek within the city limits of Lansing. | |
|---|---|
| Category: | Prevention |
| Jurisdiction: | Lansing |
| Hazard: | Flood |
| Goal.Objective: | 1.2, 3.1, 4.1, |
| Background / Benefit: | The City of Lansing has identified a need for professional services and construction for stream bank stabilization at various location on Nine Mile Creek and Seven Mile Creek where bank erosion threatens public utilities or private improvements. |
| Priority: | Moderate |
| Funding Sources: | Local / State / Federal |
| Responsibility Assigned to: | City of Lansing |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | Requires Funding |

| 8. Seek contractors proposal to perform maintenance activities along Nine Mile Creek and Seven Mile Creek within the city limits of Lansing. | |
|---|---|
| Category: | Prevention |
| Jurisdiction: | Lansing |
| Hazard: | Flood |
| Goal.Objective: | 1.1, 1.2, 3.1, 4.1, |
| Background / Benefit: | The City of Lansing has identified a need for contractor removal or deadfall and/or log jams from Nine Mile Creek and Seven Mile Creek within the city limits of Lansing. |
| Priority: | Moderate |
| Funding Sources: | Local / State / Federal |
| Responsibility Assigned to: | City of Lansing |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | Requires Funding |

| 9. Seek contractors proposal to perform storm water quality monitoring in the City of Lansing. | |
|---|---|
| Category: | Prevention |
| Jurisdiction: | Lansing |
| Hazard: | Flood |
| Goal.Objective: | 1.1, 1.2, 3.1, 3.2, 4.1, |
| Background / Benefit: | The City of Lansing has identified a need to have a contractor perform storm water quality monitoring on a routine basis within the City of Lansing. |
| Priority: | Moderate |
| Funding Sources: | Local / State / Federal |
| Responsibility Assigned to: | City of Lansing |
| Target Completion Date: | December 31, 2014 |
| Cost of Action: | Requires Funding |

| Leavenworth |
|---|

| 1. Identify flash-flood prone areas to consider flood reduction measures to city planners. | |
|---|---|
| Category: | Prevention |
| Jurisdiction: | Leavenworth |
| Hazard: | Flood |
| Goal.Objective: | 1.1, 2.1, |
| Background / Benefit: | Flood zone mapping has provided initial identification of potential hazard areas that can be reviewed with other data sources, such as the watershed districts goals and objectives, in developing long range planning activities for flood prevention, or other planning steps to reduce exposure to this hazard. |
| Priority: | High |
| Funding Sources: | Local |
| Responsibility Assigned to: | City Planner / Floodplain Manager / Public Works Director |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | No Cost / Low Cost |

| 2. Reduce danger and damage from repetitive flooding events by developing a program to acquire residential and commercial properties in coordination with FEMA acquisition programs. | |
|---|---|
| Category: | Property Protection |
| Jurisdiction: | Leavenworth |
| Hazard: | Flood |
| Goal.Objective: | 1.1, 1.2, 2.1, |
| Background / Benefit: | There has been a history of repetitive flooding of residential and commercial buildings in several locations in the City of Leavenworth. Flooding events occur in these areas due to a sustained duration of high-intensity rainfall and to elevated water levels of the Missouri River, Three Mile Creek, and a tributary of Five Mile Creek. This has caused significant danger to both residents and emergency personnel, as well as damage to homes and businesses. Flooding in these areas is related to sustained duration of high intensity rainfall as well as high water in the Missouri River. These residential and commercial properties were flooded in 1985, 1993, 1998, and 2005, as well as 13 additional historic flood events. The City of Leavenworth has identified these properties as 35 residential structures, at an estimated acquisition cost of $2,450,220, and 22 commercial structures, at an estimated acquisition cost of $2,007,570. One residential structure and one commercial structure appear on the Repetitive Loss Properties list for the City of Leavenworth and are reported to have flood insurance; the remaining structures targeted for acquisition activities by the City of Leavenworth do not appear to have flood insurance and do not appear on the Repetitive Loss Properties list for the City of Leavenworth. |
| Priority: | Moderate |
| Funding Sources: | Local/State/Federal |
| Responsibility Assigned to: | City of Leavenworth |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | Requires Funding |

| 3. Seek funding to purchase a portable dam system to reduce exposure from flooding to the Leavenworth Community Center. | |
|---|---|
| Category: | Property Protection |
| Jurisdiction: | Leavenworth |
| Hazard: | Flood |
| Goal.Objective: | 1.1, 1.2, |
| Background / Benefit: | The Leavenworth Community Center, located at 123 South Esplanade, is listed on the National Register of Historic Places, and is a focal point of social and community activity in the City. Flooding events are attributed to elevated water levels of the Missouri River. The building was flooded in 1951; was protected from flooding in 1993 by a large sandbag wall; and protected by a rented portable dam system in 2007. Given its location and flood history, it is expected to be threatened by flooding in the future. Flooding of this building will damage a historic structure and repair costs are expected to be significant. |
| Priority: | Moderate |
| Funding Sources: | Local/State/Federal |
| Responsibility Assigned to: | City of Leavenworth |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | Requires Funding |

| 4. Seek funding to purchase a portable dam system to reduce exposure from flooding to the City of Leavenworth Wastewater Treatment Plant. | |
|---|---|
| Category: | Property Protection |
| Jurisdiction: | Leavenworth |
| Hazard: | Flood |
| Goal.Objective: | 1.1, 1.2, |
| Background / Benefit: | The City of Leavenworth Wastewater Treatment Plant, located on South 2nd Street, suffers flooding events primarily related to the elevation of the Missouri River. It is also subject to flooding if a high-intensity event occurs in the Five Mile Creek drainage basin while the Missouri River elevations are up. The facility suffered extensive flood damage in 1993. The facility was expected to be flooded in 2007 and was protected by a sandbag wall. Flood damage to the facility causes untreated wastewater to be discharged to the Missouri River; repair costs are estimated to be significant. |
| Priority: | Moderate |
| Funding Sources: | Local/State/Federal |
| Responsibility Assigned to: | City of Leavenworth |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | Requires Funding |

| 5. Seek funding to construct a new City of Leavenworth Animal Control Shelter Building to replace the existing structure which is susceptible to repeated flooding events. | |
|---|---|
| Category: | Structural Projects |
| Jurisdiction: | Leavenworth |
| Hazard: | Flood |
| Goal.Objective: | 1.1, 1.2, 2.1, |
| Background / Benefit: | The City of Leavenworth Animal Control Shelter Building, located on South 2nd Street, suffers flooding events primarily related to the elevation of the Missouri River. It is also subject to flooding if a high-intensity event occurs in the Five Mile Creek drainage basin while the Missouri River elevations are up. The facility suffered extensive flood damage in 1993. The facility was predicted to be flooded in 2007 and was protected by a sandbag wall. Damage to the Animal Control building causes significant disruption of service for animal control activities in Leavenworth and Leavenworth County. This facility serves as an animal shelter and alternative housing for the animals, who must be relocated each time it is threatened with flooding. |
| Priority: | Low |
| Funding Sources: | Local/State/Federal |
| Responsibility Assigned to: | City of Leavenworth |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | Requires Appropriation of Significant Funding |

| Linwood |
|---|

| 1. Identify flash-flood prone areas to consider flood reduction measures to city planners. | |
|---|---|
| Category: | Prevention |
| Jurisdiction: | Linwood |
| Hazard: | Flood |
| Goal.Objective: | 1.1, 2.1, |
| Background / Benefit: | Flood zone mapping has provided initial identification of potential hazard areas that can be reviewed with other data sources, such as the watershed districts goals and objectives, in developing long range planning activities for flood prevention, or other planning steps to reduce exposure to this hazard. |
| Priority: | High |
| Funding Sources: | Local |
| Responsibility Assigned to: | Planning Commission |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | No Cost / Low Cost |

| 2. Conduct a study to determine the efficacy of the existing warning siren system within the Jurisdiction, and repair and install new sirens as needed to ensure area coverage. | |
|---|---|
| Category: | Emergency Services |
| Jurisdiction: | Linwood |
| Hazard: | Tornado |
| Goal.Objective: | 1.2, 1.3, |
| Background / Benefit: | Reduce the possibility of damages and loss of life to the citizens by maintaining and upgrading the early warning system for the City of Linwood. |
| Priority: | Moderate |
| Funding Sources: | Local |
| Responsibility Assigned to: | Local Officials |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | Requires Funding |

| Tonganoxie |
|---|

| 1. Identify flash-flood prone areas to consider flood reduction measures to city planners. | |
|---|---|
| Category: | Prevention |
| Jurisdiction: | Tonganoxie |
| Hazard: | Flood |
| Goal.Objective: | 1.1, 2.1, |
| Background / Benefit: | Flood zone mapping has provided initial identification of potential hazard areas that can be reviewed with other data sources, such as the watershed districts goals and objectives, in developing long range planning activities for flood prevention, or other planning steps to reduce exposure to this hazard. |
| Priority: | High |
| Funding Sources: | Local |
| Responsibility Assigned to: | City Planning Committee / Floodplain Manager |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | No Cost / Low Cost |

| 2. Develop and fund professional services to augment the City of Tonganoxie's GIS capability to provide condition investigation, analysis of streamways, develop stream buffer mapping, provide updated 2 ft. interval hypsography for the entire Tonganoxie growth area to allow for improved storm water modeling and management, draft a stream buffer zoning ordinance for the city, produce digital 2 ft. contour mapping for use in storm water analysis and planning, and develop interactive floodplain and property parcel GIS application and database for use by city staff. | |
|---|---|
| Category: | Public Information and Awareness |
| Jurisdiction: | Tonganoxie |
| Hazard: | Flood |
| Goal.Objective: | 1.1, 1.2, 4.1, |
| Background / Benefit: | Utilization of GIS capabilities should be expanded to include the use of ArcInfo and AutoCad format for various flood-related projects throughout the City of Tonganoxie and the Tonganoxie Growth Area. |
| Priority: | Moderate |
| Funding Sources: | Local / State / Federal |
| Responsibility Assigned to: | City of Tonganoxie Planner |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | Requires Funding |

| 3. Research funding options for professional services and construction of stream bank stablization on Tonganoxie Creek within the city limits of Tonganoxie. | |
|---|---|
| Category: | Prevention |
| Jurisdiction: | Tonganoxie |
| Hazard: | Flood |
| Goal.Objective: | 1.2, 3.1, 4.1, |
| Background / Benefit: | The City of Tonganoxie has identified a need for professional services and construction for stream bank stabilization at various locations on Tonganoxie Creek where bank erosion threatens public utilities or private improvements. |
| Priority: | Moderate |
| Funding Sources: | Local / State / Federal |
| Responsibility Assigned to: | City of Tonganoxie |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | Requires Funding |

| 4. Research and fund engineering services for a city-wide storm water infrastructure-needs assessment. | |
|---|---|
| Category: | Prevention |
| Jurisdiction: | Tonganoxie |
| Hazard: | Flood |
| Goal.Objective: | 1.1, 1.2, 3.1, 3.2, |
| Background / Benefit: | The City of Tonganoxie has identified the need for professional services to perform a storm water infrastructure needs assessment throughout the City of Tonganoxie. |
| Priority: | Moderate |
| Funding Sources: | Local / State / Federal |
| Responsibility Assigned to: | City of Tonganoxie Engineer |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | Requires Funding |

| 5. Seek contractors proposal to perform maintenance activities along Tonganoxie Creek within the city limits of Tonganoxie. | |
|---|---|
| Category: | Prevention |
| Jurisdiction: | Tonganoxie |
| Hazard: | Flood |
| Goal.Objective: | 1.1, 1.2, 3.1, 4.1, |
| Background / Benefit: | The City of Tonganoxie has identified a need for contractor removal or deadfall and/or log jams from Tonganoxie Creek within the city limits of Tonganoxie. |
| Priority: | Moderate |
| Funding Sources: | Local / State / Federal |
| Responsibility Assigned to: | City of Tonganoxie |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | Requires Funding |

| 6. Seek contractors proposal to perform storm water quality monitoring in the City of Tonganoxie. | |
|---|---|
| Category: | Prevention |
| Jurisdiction: | Tonganoxie |
| Hazard: | Flood |
| Goal.Objective: | 1.1, 1.2, 3.1, 3.2, 4.1, |
| Background / Benefit: | The City of Tonganoxie has identified a need to have a contractor perform storm water quality monitoring on a routine basis within the City of Tonganoxie. |
| Priority: | Moderate |
| Funding Sources: | Local / State / Federal |
| Responsibility Assigned to: | City of Tonganoxie |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | Requires Funding |

| 7. Incorporate the inspection and management of trees into the city maintenance program that may pose a threat to the electrical lines that could result in power outages during ice storms. | |
|---|---|
| Category: | Prevention |
| Jurisdiction: | Tonganoxie |
| Hazard: | Ice Storm |
| Goal.Objective: | 1.3, 3.1, 3.2, |
| Background / Benefit: | Significant amounts of property damage occur during ice storms that result from tree failure. Trees that fall into utility lines have additional serious consequences such as causing power outages, surges, fires and other damage. The jurisdiction's ability to recognize and prevent hazardous tree conditions (through inspection, pruning or removal) is the best defense against problems and costly damages resulting from tree failure. Specifically, trees located on jurisdictional property, which pose immediate threats to property, utility lines and other critical facilities should be addressed. |
| Priority: | Moderate |
| Funding Sources: | Local / State / Federal |
| Responsibility Assigned to: | City of Tonganoxie |
| Target Completion Date: | Continuous |
| Cost of Action: | Requires Funding |

| 8. Conduct a study to determine the efficacy of the existing warning siren system within the Jurisdiction, and repair and install new sirens as needed to ensure area coverage. | |
|---|---|
| Category: | Emergency Services |
| Jurisdiction: | Tonganoxie |
| Hazard: | Tornado |
| Goal.Objective: | 1.2, 1.3, |
| Background / Benefit: | Reduce the possibility of damages and loss of life to the citizens by maintaining and upgrading the early warning system for the City of Tonganoxie. |
| Priority: | Moderate |
| Funding Sources: | Local |
| Responsibility Assigned to: | Local Officials |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | Requires Funding |

| 9. Create a working group to assess the county's firefighting / EMS resources to identify any existing needs or shortfalls in terms of personnel, equipment or additional required resources. | |
|---|---|
| Category: | Prevention |
| Jurisdiction: | Tonganoxie |
| Hazard: | Multi-Hazard |
| Goal.Objective: | 1.3, 1.4, 4.1, |
| Background / Benefit: | A survey should be completed in order to verify the county's current firefighting / EMS resources are adequate for public safety. Any identified needs or shortfalls should become documented and result in specific recommendations to the County Commission for firefighting enhancements. |
| Priority: | Moderate |
| Funding Sources: | Local / State / Federal |
| Responsibility Assigned to: | City of Tonganoxie Fire Chief / EMS |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | Requires Funding |

| 10. Seek funding to retain an engineer to design a safe room within the City of Tonganoxie City Hall or Fire Station and apply for grant funding for construction. | |
|---|---|
| Category: | Structural Projects |
| Jurisdiction: | Tonganoxie |
| Hazard: | Tornado |
| Goal.Objective: | 2.4, 3.1, |
| Background / Benefit: | A lack of tornado shelters poses a serious risk to the community, including City of Tonganoxie employees. The City of Tonganoxie has identified a need for a safe room within the existing Tonganoxie City Hall or Fire Station. |
| Priority: | Moderate |
| Funding Sources: | Local / State / Federal |
| Responsibility Assigned to: | City of Tonganoxie |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | Requires Funding |

University of St. Mary

| 1. Incorporate the inspection and management of trees into the University's routine maintenance process to remove trees that may increase the risk of power failure throughout the campus infrastructure. | |
|---|---|
| Category: | Prevention |
| Jurisdiction: | University of St. Mary |
| Hazard: | Multi-Hazard |
| Goal.Objective: | 1.3, 3.1, 3.2, |
| Background / Benefit: | A significant amount of property damage during high wind events and other weather events results from tree failure. Trees that fall into utility lines have additional serious consequences such as causing power outages, surges, fires and other damage. The jurisdiction’s ability to recognize and prevent hazardous tree conditions (through inspection, pruning or removal) is the best defense against problems and costly damages resulting from tree failure. Specifically, trees located on University property, which pose immediate threats to property, utility lines or critical facilities should be addressed. |
| Priority: | Moderate |
| Funding Sources: | Local |
| Responsibility Assigned to: | University of St. Mary |
| Target Completion Date: | Continuous |
| Cost of Action: | Requires Funding |

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| 2. Appoint a committee to develop a radio communications plan between campus security units and outside agencies of Leavenworth County and the City of Leavenworth to ensure interoperability between all communities. The Plan should address equipment compatibility and upgrade requirements to implement the Plan. | |
|---|---|
| Category: | Emergency Services |
| Jurisdiction: | University of St. Mary |
| Hazard: | Multi-Hazard |
| Goal.Objective: | 1.3, 4.1, |
| Background / Benefit: | The University of St. Mary has identified a need to implement interoperable radio communications between its security staff and county and city services in case of campus emergency. |
| Priority: | Moderate |
| Funding Sources: | Local / State / Federal |
| Responsibility Assigned to: | University of St. Mary / City of Leavenworth / Leavenworth County |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | Requires Funding |

| 3. Appoint a committee to research and implement enhancement to the University's early warning systems for students and staff for weather alerts and campus emergencies. Enhancements may include a campus website identifying emergencies on campus. | |
|---|---|
| Category: | Emergency Services |
| Jurisdiction: | University of St. Mary |
| Hazard: | Multi-Hazards |
| Goal.Objective: | 1.3, 4.1, |
| Background / Benefit: | The University of St. Mary has identified a need to enhance the University's ability to issue early warnings for students and staff for weather events or campus emergencies in an effective, dependable, and rapid manner. |
| Priority: | Moderate |
| Funding Sources: | Local / State / Federal |
| Responsibility Assigned to: | University of St. Mary |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | Requires Funding |

USD 449

| 1. Develop and fund mitigation projects for the construction of tornado safe rooms for Unified School District 449 schools. | |
|---|---|
| Category: | Tornado |
| Jurisdiction: | USD 449 |
| Hazard: | Tornado |
| Goal.Objective: | 2.4, 3.1, 3.2, |
| Background / Benefit: | Schools are particularly vulnerable to potential damage from tornadoes and high winds. Students, faculty, and staff should seek safe shelter when a tornado threatens. Tornado safe rooms should be constructed in schools to ensure a safe place for students to go during a tornado event. Safe rooms may be funded by FEMA during new school construction, as part of school additions, or as retrofits. |
| Priority: | Moderate |
| Funding Sources: | FEMA |
| Responsibility Assigned to: | School District/State/FEMA |
| Target Completion Date: | Continuous |
| Cost of Action: | Requires Funding |

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| USD 453 |
|---|

| 1. Develop and fund mitigation projects for the construction of tornado safe rooms in the schools of USD #453. | |
|---|---|
| Category: | Structural |
| Jurisdiction: | USD 453 |
| Hazard: | Tornado |
| Goal.Objective: | 2.4, 3.1, 3.2, |
| Background / Benefit: | Schools are particularly vulnerable to potential damage from tornadoes and high winds. Students, faculty, and staff should seek safe shelter when a tornado threatens. Tornado safe rooms should be constructed in schools of USD 453 to ensure a safe place for students to go during a tornado event. Safe rooms may be funded during new school construction as part of school additions or as retrofits. |
| Priority: | Moderate |
| Funding Sources: | FEMA |
| Responsibility Assigned to: | School District / FEMA |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | Requires Funding |

USD 458

| 1. Develop and fund mitigation projects for the construction of tornado safe rooms in the schools of USD #458 in both Basehor and Linwood. | |
|---|---|
| Category: | Structural |
| Jurisdiction: | USD 458 |
| Hazard: | Tornado |
| Goal.Objective: | 2.4, 3.1, 3.2, |
| Background / Benefit: | Schools are particularly vulnerable to potential damage from tornadoes and high winds. Students, faculty, and staff should seek safe shelter when a tornado threatens. Tornado safe rooms should be constructed in schools of USD 458 to ensure a safe place for students to go during a tornado event. Safe rooms may be funded during new school construction, as part of school additions, or as retrofits. |
| Priority: | Moderate |
| Funding Sources: | FEMA |
| Responsibility Assigned to: | School District / FEMA |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | Requires Funding |

| 2. Assess elevations and water flow in the district to qualify the benefit of flood control projects in the District. | |
|---|---|
| Category: | Prevention, Property Protection |
| Jurisdiction: | USD 458 |
| Hazard: | Flood |
| Goal.Objective: | 1.1, 3.1, 3.2, |
| Background / Benefit: | The Basehor-Linwood Unified School District #458 would like to analyze the potential benefits of constructing soil-based berms, and other flood control projects, around various facilities in the district to mitigate the effects from flooding. |
| Priority: | Moderate |
| Funding Sources: | Local / State / Federal |
| Responsibility Assigned to: | School District |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | Requires Funding |

USD 464

| 1. Develop and fund mitigation projects for the construction of tornado safe rooms in the schools of USD #464 in Tonganoxie. | |
|---|---|
| Category: | Structural |
| Jurisdiction: | USD 464 |
| Hazard: | Tornado |
| Goal.Objective: | 2.4, 3.1, 3.2, |
| Background / Benefit: | Schools are particularly vulnerable to potential damage from tornadoes and high winds. Students, faculty, and staff should seek safe shelter when a tornado threatens. Tornado safe rooms should be constructed in schools of USD 464 to ensure a safe place for students to go during a tornado event. Safe rooms may be funded during new school construction, as part of school additions, or as retrofits. |
| Priority: | Moderate |
| Funding Sources: | FEMA |
| Responsibility Assigned to: | School District / State / FEMA |
| Target Completion Date: | Continuous |
| Cost of Action: | Requires Funding |

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| 2. Obtain funding for the purchase and installation of backup power generators for the schools of USD 464. | |
|---|---|
| Category: | Prevention |
| Jurisdiction: | USD 464 |
| Hazard: | Multi-Hazard |
| Goal.Objective: | 3.1, 3.2, |
| Background / Benefit: | USD 464 has identified a need to quickly restore power in all of its schools in the event of a weather event and the subsequent loss of power. |
| Priority: | Moderate |
| Funding Sources: | Local / State / Federal |
| Responsibility Assigned to: | School District |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | Requires Funding |

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| 3. Seek funding to retain a professional school safety and security firm to review and update the school's Security Plan for domestic acts of terrorism, building security, and contagious disease response. | |
|---|---|
| Category: | Prevention |
| Jurisdiction: | USD 464 |
| Hazard: | Terrorism / Agri-Terrorism / Civil Disorder |
| Goal.Objective: | 1.3, 3.1, |
| Background / Benefit: | As domestic acts of terrorism are becoming more of reality, many officials believe that the next wave of terrorists acts may be aimed at public school systems. Although these events are impossible to predict with great accuracy, updating building security, school security plans, and USD emergency plans can prepare school districts such as USD 464 for these events. Companies such as the National School Safety and Security Services provide the expertise in this field to help review and upgrade plans for the district. |
| Priority: | Moderate |
| Funding Sources: | Local / State / Federal |
| Responsibility Assigned to: | Board of Education / School Superintendent |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | Requires Funding |

USD 469

| 1. Develop and fund mitigation projects for the construction of tornado / thunderstorm wind safe rooms in the schools of USD #469 in Lansing. | |
|---|---|
| Category: | Structural |
| Jurisdiction: | USD 469 |
| Hazard: | Multi-Hazard |
| Goal.Objective: | 2.4, 3.1, 3.2, |
| Background / Benefit: | Schools are particularly vulnerable to potential damage from tornadoes and high winds. Students, faculty, and staff should seek safe shelter when a tornado or thunderstorm winds threatens. Safe rooms should be constructed in schools of USD 469 to ensure a safe place for students to go during a tornado or thunderstorm wind event. Safe rooms may be funded during new school construction, as part of school additions, or as retrofits. |
| Priority: | Moderate |
| Funding Sources: | FEMA |
| Responsibility Assigned to: | School District / State / FEMA |
| Target Completion Date: | Continuous |
| Cost of Action: | Requires Funding |

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| 2. Seek funding to retain a professional school safety and security firm to review and update the school's Security Plan for domestic acts of terrorism, building security, and contagious disease response. | |
|---|---|
| Category: | Prevention |
| Jurisdiction: | USD 469 |
| Hazard: | Terrorism / Agri-Terrorism / Civil Disorder |
| Goal.Objective: | 1.3, 3.1, |
| Background / Benefit: | As domestic acts of terrorism are becoming more of reality, many officials believe that the next wave of terrorists acts may be aimed at public school systems. Although these events are impossible to predict with great accuracy, updating building security, school security plans, and USD emergency plans can prepare school districts such as USD 469 for these events. Companies such as the National School Safety and Security Services provide the expertise in this field to help review and upgrade plans for the district. |
| Priority: | Moderate |
| Funding Sources: | Local / State / Federal |
| Responsibility Assigned to: | Board of Education / School Superintendent |
| Target Completion Date: | December 31, 2015 |
| Cost of Action: | Requires Funding |

## 5.3 Implementation

*Multihazard Requirement: §201.6(c)(3)(iii): [The mitigation strategy section shall include] an action plan describing how the actions identified in section (c)(3)(ii) will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.*

The Leavenworth County Multi-Jurisdictional Mitigation Plan will be implemented through the delegation of assignments as specified within this Plan. Mitigation Actions for each jurisdiction are listed and assigned specific implementation measures which include the assignment of responsibilities to governmental departments and/or specific staff, along with the establishment of a target completion date for each proposed mitigation action. When applicable, potential funding sources were also listed.

It will be the responsibility of the Leavenworth County Commission and designees for each jurisdiction, to confirm the target completion dates, assess progress, provide policy revisions, and give final approval of the Plan and its objectives.

### Planning and Incorporation of Mitigation Plan

The Leavenworth County Emergency Management Department will support mitigation activities through continued participation in the NFIP and flood plain development, in conjunction with the county commission oversight of land planning and other departments within the county, to guide and control development.

It is intended to utilize this Mitigation Plan as a reference guide for future growth and expansion efforts in the county, and incorporate the goals, objectives and actions into other planning documents as revisions and updates are made. Where feasible, mitigation actions will be incorporated into development and planning ordinances to reduce potential risk to the county and residents.

It will be the responsibility of the Leavenworth County Commission, and the designee(s) for each jurisdiction, to confirm that these actions are ultimately carried out no later than the target completion dates unless reasonable circumstances prevent their implementation (i.e., lack of funding availability). Otherwise, the completion of each proposed mitigation action has been determined to be feasible within the timeframe allowed.

Specific procedures for regular monitoring and reporting of progress on the proposed mitigation actions are provided in Section 6.0 - Plan Maintenance.

### Funding Sources

Although mitigation techniques will likely save money in the long run by avoiding losses, many projects are costly to implement. Leavenworth County will continue to seek outside funding assistance for mitigation projects in both the pre- and post-disaster environment. This portion of the plan identifies the primary federal and state grant programs for Leavenworth County to consider, and also briefly discusses local and non-governmental funding sources.

### Federal

The following federal grant programs have been identified as funding sources which specifically target hazard mitigation projects:

### Pre-Disaster Mitigation Program Agency: Federal Emergency Management Agency

Through the Disaster Mitigation Act of 2000, Congress approved the creation of a national program to provide a funding mechanism that is not dependent on a Presidential disaster declaration. The Pre-Disaster Mitigation (PDM) Program provides funding to states and communities for cost-effective hazard mitigation activities that complement a comprehensive mitigation program, and reduce injuries, loss of life, and damage to and destruction of property.

The funding is based upon a 75 percent federal share, 25 percent non-federal share. The non-federal match can be fully in-kind or cash, or a combination. Special accommodations will be made for “small and impoverished communities”, who will be eligible for 90% federal share, 10% non-federal.

The Pre-Disaster Mitigation (PDM) Program was authorized by §203 of the Robert T. Stafford Disaster Assistance and Emergency Relief Act (Stafford Act), 42 USC, as amended by §102 of the Disaster Mitigation Act of 2000. Funding for the program is provided through the National Pre-Disaster Mitigation Fund to assist States and local governments (to include Indian Tribal governments) in implementing cost-effective hazard mitigation activities that complement a comprehensive mitigation program. All applicants must be participating in the National Flood Insurance Program (NFIP) if they have been identified through the NFIP as having a Special Flood Hazard Area (a Flood Hazard Boundary Map (FHBM) or Flood Insurance Rate Map (FIRM) has been issued). In addition, the community must not be suspended or on probation from the NFIP.

44 CFR Part 201, Hazard Mitigation Planning, establishes criteria for State and local hazard mitigation planning authorized by §322 of the Stafford Act, as amended by §104 of the DMA. After November 1, 2003, local governments and Indian Tribal governments applying for PDM funds through the States will have to have an approved local mitigation plan prior to the approval of local mitigation project grants. States will also be required to have an approved Standard State mitigation plan in order to receive PDM funds for State or local mitigation projects after November 1, 2004. Therefore, the development of State and local multi-hazard mitigation plans is key to maintaining eligibility for future PDM funding.

FEMA provides PDM grants to states that, in turn, can provide sub-grants to local governments for accomplishing the following eligible mitigation activities:

- State and local hazard mitigation planning,
- Technical assistance [e.g. risk assessments, project development],
- Mitigation Projects,
- Acquisition or relocation of vulnerable properties,
- Hazard retrofits,
- Minor structural hazard control or protection projects, community outreach and education up to 10% of State allocation

### Flood Mitigation Assistance Program Agency: Federal Emergency Management Agency

FEMA's Flood Mitigation Assistance program (FMA) provides funding to assist states and communities in implementing measures to reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, and other structures insurable under the National Flood Insurance Program (NFIP). FMA was created as part of the National Flood Insurance Reform Act of 1994 (42 U.S.C. 4101) with the goal of reducing or eliminating claims under the NFIP.

There are three types of grants available under FMA: Planning, Project, and Technical Assistance Grants. FMA Planning Grants are available to States and jurisdictions to prepare Flood Mitigation Plans. NFIP-participating jurisdictions with approved Flood Mitigation Plans can apply for FMA Project Grants. FMA Project Grants are available to States and NFIP participating jurisdictions to implement measures to reduce flood losses. Ten percent of the Project Grant is made available to States as a Technical Assistance Grant. These funds may be used by the State to help administer the program. Jurisdictions receiving FMA Planning and Project Grants must be participating in the NFIP. Three examples of eligible FMA projects include: the elevation, acquisition, and relocation of NFIP-insured structures.

FMA is a pre-disaster grant program, and is made available to states on an annual basis. This funding is available for mitigation planning and implementation of mitigation measures only, and is based upon a 75 percent federal share, 25 percent non-federal share. States administer the FMA program and are responsible for selecting projects for funding from the applications submitted by all jurisdictions within the state. The state then forwards selected applications to FEMA for an eligibility determination. Although individuals cannot apply directly for FMA funds, their local government may submit an application on their behalf.

### Hazard Mitigation Grant Program Agency: Federal Emergency Management Agency

The Hazard Mitigation Grant Program (HMGP) was created in November 1988 through Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act. The HMGP assists states and local jurisdictions in implementing long-term mitigation measures following a Presidential disaster declaration.

To meet these objectives, FEMA can fund up to 75 percent of the eligible costs of each project. The state or local cost-share match does not need to be cash, in-kind services or materials may also be used. With the passage of the Hazard Mitigation and Relocation Assistance Act of 1993, federal funding under the HMGP is now based on 15 percent of the federal funds being spent on the Public and Individual Assistance programs (minus administrative expenses) for each disaster.

The HMGP can be used to fund projects to protect either public or private property, as long as the projects in question fit within the state and local government's overall mitigation strategy for the disaster area, and comply with program guidelines. Examples of projects that may be funded include: the acquisition or relocation of structures from hazard-prone areas; the retrofitting of existing structures to protect them from future damages; the development of state or local standards designed to protect buildings from future damages.

Eligibility for funding under the HMGP is limited to state and local governments, certain private nonprofit organizations or institutions that serve a public function, Indian tribes and authorized tribal organizations. These organizations must apply for HMGP project funding on behalf of their citizens. In turn, applicants must work through their state, since the state is responsible for setting priorities for funding and administering the program.

### Public Assistance (Infrastructure) Program, Section 406 Agency: Federal Emergency Management Agency

FEMA's Public Assistance Program, through Section 406 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, provides funding to local governments following a Presidential disaster declaration for mitigation measures in conjunction with the repair of damaged public facilities and infrastructure. The mitigation measures must be related to eligible disaster-related damages and must directly reduce the potential of future, similar disaster damages to the eligible facility. These opportunities usually present themselves during repair/replacement efforts.

Proposed projects must be approved by FEMA prior to funding. They will be evaluated for cost effectiveness, technical feasibility, and compliance with statutory, regulatory and executive order requirements. In addition, the evaluation must ensure that the mitigation measures do not negatively impact a facility's operation or increase risk from another hazard.

The Public Assistance Program provides supplemental Federal disaster grant assistance for the repair, replacement, or restoration of disaster-damaged, publicly owned facilities and the facilities of certain Private Non-Profit (PNP) organizations. The Federal share of assistance is not less than 75% of the eligible cost for emergency measures and permanent restoration. The State determines how the non-Federal share (up to 25%) is split with the applicants.

Public facilities are operated by state and local governments, Indian tribes or authorized tribal organizations and include:

- Roads, bridges and culverts
- Draining and irrigation channels
- Schools, city halls and other buildings
- Water, power and sanitary systems
- Airports and parks

Private nonprofit organizations are groups that own or operate facilities that provide services otherwise performed by a government agency and include, but are not limited to the following:

- Universities and other schools
- Hospitals and clinics
- Volunteer fire and ambulance
- Power cooperatives and other utilities
- Custodial care and retirement facilities
- Museums and community centers

### SBA Disaster Assistance Program Agency: U.S. Small Business Administration

The SBA Disaster Assistance Program provides low-interest loans to businesses following a Presidential Disaster Declaration (PDA). The loans target businesses that need to repair or replace uninsured disaster damages to property they own, including real estate, machinery and equipment, inventory and supplies. Businesses of any size are eligible, as well as non-profit organizations.

SBA loans can be utilized by their recipients to incorporate mitigation techniques into the repair and restoration of their business.

### Community Development Block Grants Agency: U.S. Department of Housing and Urban Development

The Community Development Block Grant (CDBG) program provides grants to local governments for community and economic development projects that primarily benefit low- and moderate-income people. The CDBG program also provides grants for post-disaster hazard mitigation and recovery following a PDA. Funds can be used for activities such as acquisition, rehabilitation or reconstruction of damaged properties and facilities and for the redevelopment of disaster areas.

### Individual and Households Program/Other Needs Assistance Agencies: FEMA and KDEM

The Individual & Households, Other Needs Assistance Program (ONA) provides financial assistance to individuals or households who sustain damage or develop serious needs because of a natural or man-made disaster. The funding share is 75% federal funds and 25% state funds. The ONA program provides grants for necessary expenses and serious needs that cannot be provided for by insurance, another federal program, or other source of assistance.

The current maximum allowable amount for any one disaster to individuals or families is $25,000. The program gives funds for disaster-related necessary expenses and serious needs, including the following categories:

- Personal property
- Transportation
- Medical and dental
- Funeral
- Essential tools
- Flood insurance
- Moving and storage

In accordance with the Stafford Act, the program is initiated by inclusion in the Governor's request for a presidential declaration.

The ONA Program is not intended to indemnify a victim against disaster losses or to purchase or replace items or provide services that could be characterized as non-essential, luxury, recreational, or decorative. The program provides individuals or households with assistance to recover from a disaster and establish a habitable and sanitary living environment.

Kansas Emergency Management administers the ONA Program in cooperation with the federal government.

### Hazardous Materials Public Sector Training and Planning Grants Agency: U.S. Department of Transportation-Title 49, Volume 2, Parts 100 to 185

This part sets forth procedures for reimbursable grants for public sector planning and training in support of the emergency planning and training efforts of States, Indian tribes, and local jurisdictions to deal with hazardous materials emergencies, particularly those involving transportation. These grants will enhance the implementation of the Emergency Planning and Community Right-to-Know Act of 1986 (42 U.S.C. 11001).

The Hazardous Materials Emergency Preparedness (HMEP) grant program is intended to provide financial and technical assistance as well as national direction and guidance to enhance State, Territorial, Tribal, and local hazardous materials emergency planning and training. The HMEP Grant Program distributes fees collected from shippers and carriers of hazardous materials to emergency responders for hazmat training and to Local Emergency Planning Committees (LEPC’s) for hazmat planning.

### State

A wide array of assistance programs are available to local jurisdictions through the state governmental

agencies to assist in the event of a disaster, including small business loans, recovery programs, and mitigation programs, depending on needs and type of declared disaster in the jurisdiction. It is the intent of Leavenworth County to research and identify specific program funding that may be available for specific goals and objectives identified in this plan.

### Local

Local governments depend upon local property taxes as their primary source of revenue. These taxes are typically used to finance services that must be available and delivered on a routine and regular basis to the general public. If local budgets allow, these funds may be used for other purposes in the general public interest. Many times these funds are used to match federal or state grant programs when required for large-scale projects.

### Non-Governmental

Another potential source of revenue for implementing local mitigation projects is monetary contributions from non-governmental organizations, such as private sector companies, churches, charities, community relief funds, the Red Cross, hospitals, land trusts and other non-profit organizations.

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# 6.0 Plan Maintenance

## 6.1 Monitoring Schedule

*Multihazard Requirement §201.6(c)(4)(i): [The plan maintenance process shall include a] section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.*

During each year, periodic monitoring and reporting on the progress of the plan is required to evaluate the goals and objectives for each jurisdiction in this multijurisdictional plan. This will allow the overall plan to stay current and will measure the effectiveness of the plan. The plan has therefore been designed to be user-friendly in terms of monitoring implementation and preparing regular progress reports.

The plan is a public document, and will remain available at the Emergency Management Office, and at appropriate locations within each jurisdiction, for review and comment during normal business operations. Public comment will be documented and included in annual reporting to the county commission.

## 6.2 Evaluating Method

*Multihazard Requirement §201.6(c)(4)(i): [The plan maintenance process shall include a] section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.*

Each jurisdiction is responsible for a formal review of the mitigation plan on an annual basis with emphasis on its unique hazards, goals, and actions. Each jurisdiction is responsible to maintain a designated contact for its part of the plan and inform the EM. This review will include the following as a minimum scope:

- The EM, as Plan Administrator is responsible for scheduling an annual meeting of the Mitigation Planning Committee, or other group that may be designated such as the Local Emergency Planning Committee (LEPC), for the purpose of the overall formal review of the plan components.
- The EM will provide an annual report and/or presentation to the Board of County Commissioners (BOCC) on the implementation status of the plan during a public forum meeting. This forum can either be a scheduled county commissioners meeting or special meeting called to review mitigation planning. This report will include, at a minimum, a completed, printed version of the Mitigation Action Plan (MAP - provided as a link in the Appendix).
- The report will include an evaluation of the progress, effectiveness, and appropriateness of the mitigation actions proposed in the plan. The report will recommend, as appropriate, any required changes or amendments to the plan.

If the BOCC, on behalf of any or all of the jurisdictions, determines that the recommendations warrant modification to the plan, the BOCC may initiate a plan amendment as described in the Revisions and Updates Section.

The MAP lists the mitigation actions recommended in this plan. It has been designed to provide Leavenworth County with a user-friendly tool for monitoring the implementation of the mitigation actions recommended in the plan, and for reporting progress to the BOCC or their appointed representative. Mitigation actions may be sorted using the MAP according to the following:

> 1. By action number; 2. By category; 3. By hazard; 4. By priority; 5. By responsibility assigned to; 6. By target completion date.

The spreadsheet file is provided as a link in the Appendix and will be maintained and updated along with the Leavenworth County Hazard Mitigation Plan.

## 6.3 Revisions and Updates - Schedule

*Multihazard Requirement §201.6(c)(4)(i): [The plan maintenance process shall include a] section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.*

Periodic revisions and updates of the plan are required to ensure that the goals and objectives for Leavenworth County are kept current. More importantly, revisions may be necessary to confirm the plan is in compliance with federal regulations and state statutes. This portion of the plan outlines the procedures for completing such revisions and updates.

Five-Year Plan Review

The hazard identification and assessment, jurisdiction vulnerability assessment, and mitigation capabilities assessment should be reviewed, at a minimum, every 5-years to determine if there have been any significant changes in Leavenworth County that should be addressed and considered in the mitigation plan. Increased development, increased exposure to certain hazards, the development of new mitigation capabilities or techniques, and changes to federal or state legislation are examples of changes that may affect the condition of the plan.

Further, following a disaster declaration, the plan will need to be reviewed and/or revised to incorporate lessons learned and to address specific circumstances arising out of the disaster.

The results of any review, periodic or following a disaster, should be summarized in the plan update report prepared for the mitigation plan under the direction of the EM. The annual report will include an evaluation of the effectiveness and appropriateness of the plan, and will recommend, as appropriate, any required changes or amendments to the plan.

If the BOCC determines that the recommendations warrant modification to the plan, the BOCC may either initiate a plan amendment as described below or, if conditions justify, may direct the EM to undertake a complete update of the plan.

Plan Amendments

An amendment to the plan should be initiated only by the BOCC, either at its own initiative or upon the recommendation of the EM, or some other person or agency.

Upon initiation of an amendment to the plan, Leavenworth County will forward information on the proposed amendment to interested parties including, but not limited to, affected county departments, residents and businesses. Information will also be forwarded to the Kansas Division of Emergency Management. This information will be sent out in order to seek input on the proposed plan amendment for not less than a forty-five (45) day review and comment period.

At the end of the comment period, the proposed amendment and review comments will be forwarded to the EM (or designee) for consideration. If no comments are received from the reviewing parties within the specified review period, such will be noted accordingly. The EM or designee will review the proposed amendment along with the comments received from other parties, and submit a recommendation to the county commissioners within sixty (60) days.

In determining whether to recommend approval or denial of a plan amendment request, the following factors will be considered:

- There are errors or omissions made in the identification of issues or needs during the preparation of the plan;
- New issues or needs have been identified which were not adequately addressed in the plan;
- There has been a change in information, data, or assumptions from those on which the plan was based.

Upon receiving the recommendation of the EM or designee, the BOCC will then proceed with its established procedures for changing a document of this type. The BOCC will review the recommendation (including the factors listed above) and any oral or written comments received at the public hearing. Following that review, the BOCC will take one of the following actions:

1. Adopt the proposed amendment as presented. 2. Adopt the proposed amendment with

modifications. 3. Refer the amendments request back to the EM for further consideration. 4. Defer the amendment request for further consideration and/or hearing.

## 6.4 Incorporation into Existing Planning

*Multihazard Requirement §201.6(c)(4)(ii): [The plan shall include a] process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, when appropriate.*

The Leavenworth County Emergency Management Department will continue to incorporate mitigation planning activities into county planning functions by actively communicating the plan and its content to other departments within the county. In conjunction with BOCC oversight and continued participation in the NFIP, requirements of the mitigation plan can be incorporated into future comprehensive land planning and zoning which will guide and control development. The intent will be to utilize the mitigation plan as a reference guide for future growth and expansion efforts in the county, and to incorporate the goals, objectives and actions of the plan into other planning documents as revisions and updates are made. Where feasible, mitigation actions will be incorporated into development and planning ordinances to reduce potential risk to the county and residents.

The jurisdictions participating in this multi-jurisdictional plan believe it has the capacity to stand alone and will, for most situations, execute it as such. In the cases where the jurisdiction indicates a comprehensive plan, or related planning function, this plan will be used or incorporated in to that process as a reference or guiding document. As part of plan maintenance, the yearly review will examine and document the integration of the mitigation plan with other plans and planning functions. This process will also review new opportunities to incorporate and integrate the plan.

It will be the responsibility of the BOCC, and the designees for each jurisdiction, to confirm that these actions are ultimately carried out no later than the target completion dates unless reasonable circumstances prevent their implementation (e.g., lack of funding availability). Otherwise, the completion of each proposed mitigation action has been determined to be feasible within the timeframe allowed.

## 6.5 Continued Public Involvement

*Multihazard Requirement §201.6(c)(4)(i): [The plan maintenance process shall include a] section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.*

The plan is a public document, and will remain available at the Emergency Management Office for review and comment during normal business operations. Public comment will be documented and included in annual reporting to the BOCC.

# Appendices

# References and Resources

## Mitigation Plan References and Resources

| Mitigation Plan References and Resources |
|---|
| Air Navigation (http://www.airnav.com/airports/) |
| County Appraiser - appraisal data |
| FEMA (FIRM and DFRIM Hazard Maps, Community Status Book, NFIP Insurance Report, Community Rating System Eligible Communities |
| Global Air - Kansas Airports (http://www.globalair.com/airport/results.aspx?state=KS) |
| HAZUS infrastructure data |
| High Plains Regional Climate Center (http://www.hprcc.unl.edu/data/historical/index.php) |
| History of the State of Kansas (http://www.kancoll.org/books/cutler/) |
| Kansas Corporation Commission (http://www.kcc.state.ks.us/index.htm) |
| Kansas Department of Agriculture - Water Resources Division, and Water Structures Division (dam and levee data) |
| Kansas Department of Transportation (County, Hiughway, and Railroad Maps and data) |
| Kansas Geological Society (http://www.kgs.ku.edu/) |
| Kansas State Historical Society (http://www.kshs.org/) |
| Kansas University - Institute for Policy Research (http://www.ipsr.ku.edu/) |
| Local Fiscal Capability (county/city Budget and Finance data) |
| Local Mitigation Capabilities (Section 3.10) |
| National Climatic Data Center (http://lwf.ncdc.noaa.gov/oa/climate/severeweather/extremes.html) |
| National Register of Historic Places (http://nationalregisterofhistoricplaces.com/KS/state.html) |
| U.S. Census Bureau (Demographics - DP-1, DP-2, DP-3, DP-4) |
| U.S. Department of Labor (http://stats.bls.gov/) |
| U.S. EPA Watershed data (http://cfpub.epa.gov/surf/county_list.cfm) |
| U.S. Hometown Locator (http://www.hometownlocator.com/) |
| U.S.Army Corps of Engineers (http://www.nwk.usace.army.mil/index.cfm) |
| United States Geological Society (http://pubs.usgs.gov/ha/ha730/index.html) |
| USDA - Census of Agriculture (http://www.agcensus.usda.gov/index.asp) |
| Wikipedia (http://wikipedia.org) |

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# Meeting Sign-in Forms

Initial Contacts List is not available except online.
Meeting Attendance - First Planning Meeting is not available except online.
Meeting Attendance - Second Planning Meeting is not available except online.
Meeting Attendance - First Public Meeting is not available except online.
Meeting Attendance - Second Public Meeting is not available except online.

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# Letters of Authorization

Basehor is not available except online.
Easton is not available except online.
Lansing is not available except online.
Leavenworth is not available except online.
Linwood is not available except online.
Tonganoxie is not available except online.
University of St. Mary is not available except online.
USD 449 is not available except online.
USD 453 is not available except online.
USD 458 is not available except online.
USD 464 is not available except online.
USD 469 is not available except online.

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# Meetings

First Planning Meeting Notification Letter is not available except online.
First Public Meeting Postcard Notification is not available except online.
First Public Meeting Newspaper Notification is not available except online.
Second Public Meeting Postcard Notification is not available except online.
Second Public Meeting Newspaper Notification is not available except online.

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# Alternative Mitigation Actions

Alternative Mitigation Actions is not available except online.

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# Adoption Resolutions

FEMA Approval Letter is not available except online.
Basehor is not available except online.
Easton is not available except online.
Lansing is not available except online.
City of Leavenworth is not available except online.
Leavenworth County (UnInc) is not available except online.
Linwood is not available except online.
Tonganoxie is not available except online.
USD 464 is not available except online.
USD 449 is not available except online.
USD 453 is not available except online.
USD 458 is not available except online.
USD 469 is not available except online.
University of St. Mary is not available except online.

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# Public Comments

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# Supporting Documents

Mitigation Plan - Fort Leavenworth, Kansas USD 207 is not available except online.

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# Mitigation Action Plan (MAP)

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Prevention | MultiJurisdictional | Flood | High | County Planners / City Officials | | Continuous | | 0 |

Initiative (Action)

1. Leavenworth County and the cities of Basehor, Easton, Lansing, Leavenworth, Linwood, and Tonganoxie are committed to continued participation and compliance with the National Flood Insurance Program (NFIP).

Background / Benefits

The decision on whether to join the NFIP is very important for a jurisdiction (community). There is no Federal law that requires a jurisdiction to join the program, and participation is voluntary. A benefit of participation is that the citizens are provided the opportunity to purchase flood insurance to protect themselves against flood losses. Another consideration is that a jurisdiction that has been identified by FEMA as being flood-prone and has not joined the NFIP within one year of being notified of being mapped as flood-prone will be sanctioned. Jurisdictions that regulate development in floodplains are able to participate in the NFIP. To participate in the NFIP the jurisdiction must adopt and enforce floodplain management regulations that meet or exceed the minimum requirements of the program.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.1, 1.2, | State/FEMA/Program Grants | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Prevention | Basehor | Flood | High | City Planner / Floodplain Manager | | December 31, 2015 | | 0 |

Initiative (Action)

1. Identify flash-flood prone areas to consider flood reduction measures to city/county planners.

Background / Benefits

Flood zone mapping has provided initial identification of potential hazard areas that can be reviewed with other data sources, such as the watershed districts goals and objectives, in developing long range planning activities for flood prevention, or other planning steps to reduce exposure to this hazard.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.1, 2.1, | Local | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Prevention | Lansing | Flood | High | Public Works Department / Floodplain Manager | | December 31, 2015 | | 0 |

Initiative (Action)

1. Identify flash-flood prone areas to consider flood reduction measures to city planners.

Background / Benefits

Flood zone mapping has provided initial identification of potential hazard areas that can be reviewed with other data sources, such as the watershed districts goals and objectives, in developing long range planning activities for flood prevention, or other planning steps to reduce exposure to this hazard.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.1, 2.1, | Local | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Prevention | Leavenworth | Flood | High | City Planner / Floodplain Manager / Public Works Director | | December 31, 2015 | | 0 |

Initiative (Action)

1. Identify flash-flood prone areas to consider flood reduction measures to city planners.

Background / Benefits

Flood zone mapping has provided initial identification of potential hazard areas that can be reviewed with other data sources, such as the watershed districts goals and objectives, in developing long range planning activities for flood prevention, or other planning steps to reduce exposure to this hazard.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.1, 2.1, | Local | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Prevention | Linwood | Flood | High | Planning Commission | | December 31, 2015 | | 0 |

Initiative (Action)

1. Identify flash-flood prone areas to consider flood reduction measures to city planners.

Background / Benefits

Flood zone mapping has provided initial identification of potential hazard areas that can be reviewed with other data sources, such as the watershed districts goals and objectives, in developing long range planning activities for flood prevention, or other planning steps to reduce exposure to this hazard.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.1, 2.1, | Local | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Prevention | Tonganoxie | Flood | High | City Planning Committee / Floodplain Manager | | December 31, 2015 | | 0 |

Initiative (Action)

1. Identify flash-flood prone areas to consider flood reduction measures to city planners.

Background / Benefits

Flood zone mapping has provided initial identification of potential hazard areas that can be reviewed with other data sources, such as the watershed districts goals and objectives, in developing long range planning activities for flood prevention, or other planning steps to reduce exposure to this hazard.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.1, 2.1, | Local | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Tornado | USD 449 | Tornado | Moderate | School District/State/FEMA | | Continuous | | 0 |

Initiative (Action)

1. Develop and fund mitigation projects for the construction of tornado safe rooms for Unified School District 449 schools.

Background / Benefits

Schools are particularly vulnerable to potential damage from tornadoes and high winds. Students, faculty, and staff should seek safe shelter when a tornado threatens. Tornado safe rooms should be constructed in schools to ensure a safe place for students to go during a tornado event. Safe rooms may be funded by FEMA during new school construction, as part of school additions, or as retrofits.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 2.4, 3.1, 3.2, | FEMA | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Property Protection | Consolidated Water District No 1 | Multi-Hazard | Moderate | Water District | | Continuous | | 0 |

Initiative (Action)

1. Continue to assess the impact of natural hazards on water distribution lines, systems, and equipment. Seek funding sources to mitigate damage to critical infrastructure.

Background / Benefits

With approximately 26 square miles that Consolidated Rural Water District No.1 serves in Leavenworth County, maintaining distribution capabilities are the jurisdictions top priority.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.2, 3.2, | Local/State/FEMA | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Property Protection | Big Stranger Drainage District | Multi-Hazard | Moderate | Big Stranger Drainage District | | Continuous | | 0 |

Initiative (Action)

1. The Big Stranger Drainage District will continue to protect the water and land resources within its jurisdiction. It will evaluate the need for further Big Stranger Creek maintenance projects. Additional effort will be made to seek alternative funding resources as they become available.

Background / Benefits

The Big Stranger Drainage District was formed in 1962 as an organization responsible for keeping the Big Stranger Creek free from debris. The organization is responsible for approximately 16,730 acres of the Big Stranger Creek located within the jurisdiction. The organization's primary responsiblities include tree-trimming, weed control, and debris removal from the drainage district.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.1, 1.2, | Local/State/Federal | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Prevention | University of St. Mary | Multi-Hazard | Moderate | University of St. Mary | | Continuous | | 0 |

Initiative (Action)

1. Incorporate the inspection and management of trees into the University's routine maintenance process to remove trees that may increase the risk of power failure throughout the campus infrastructure.

Background / Benefits

A significant amount of property damage during high wind events and other weather events results from tree failure. Trees that fall into utility lines have additional serious consequences such as causing power outages, surges, fires and other damage. The jurisdiction's ability to recognize and prevent hazardous tree conditions (through inspection, pruning or removal) is the best defense against problems and costly damages resulting from tree failure. Specifically, trees located on University property, which pose immediate threats to property, utility lines or critical facilities should be addressed.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.3, 3.1, 3.2, | Local | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Property Protection | Leavenworth (UnInc.) | Flood | High | Planner | | Continuous | | 0 |

Initiative (Action)

1. Develop a program to acquire and preserve parcels of land subject to repetitive flooding from willing and voluntary property owners.

Background / Benefits

Land acquisition is an effective mitigation technique to permanently eliminate the potential for damages from future flood events. Leavenworth County can apply for grant funding to acquire flood-prone parcels of land from voluntary and willing property owners.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.1, 2.1, 3.1, 3.2, 4.1, | FEMA, KDEM, Local | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Structural | USD 458 | Tornado | Moderate | School District / FEMA | | December 31, 2015 | | 0 |

Initiative (Action)

1. Develop and fund mitigation projects for the construction of tornado safe rooms in the schools of USD #458 in both Basehor and Linwood.

Background / Benefits

Schools are particularly vulnerable to potential damage from tornadoes and high winds. Students, faculty, and staff should seek safe shelter when a tornado threatens. Tornado safe rooms should be constructed in schools of USD 458 to ensure a safe place for students to go during a tornado event. Safe rooms may be funded during new school construction, as part of school additions, or as retrofits.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 2.4, 3.1, 3.2, | FEMA | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Structural | USD 453 | Tornado | Moderate | School District / FEMA | | December 31, 2015 | | 0 |

Initiative (Action)

1. Develop and fund mitigation projects for the construction of tornado safe rooms in the schools of USD #453.

Background / Benefits

Schools are particularly vulnerable to potential damage from tornadoes and high winds. Students, faculty, and staff should seek safe shelter when a tornado threatens. Tornado safe rooms should be constructed in schools of USD 453 to ensure a safe place for students to go during a tornado event. Safe rooms may be funded during new school construction as part of school additions or as retrofits.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 2.4, 3.1, 3.2, | FEMA | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Structural | USD 464 | Tornado | Moderate | School District / State / FEMA | | Continuous | | 0 |

Initiative (Action)

1. Develop and fund mitigation projects for the construction of tornado safe rooms in the schools of USD #464 in Tonganoxie.

Background / Benefits

Schools are particularly vulnerable to potential damage from tornadoes and high winds. Students, faculty, and staff should seek safe shelter when a tornado threatens. Tornado safe rooms should be constructed in schools of USD 464 to ensure a safe place for students to go during a tornado event. Safe rooms may be funded during new school construction, as part of school additions, or as retrofits.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 2.4, 3.1, 3.2, | FEMA | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Structural | USD 469 | Multi-Hazard | Moderate | School District / State / FEMA | | Continuous | | 0 |

Initiative (Action)

1. Develop and fund mitigation projects for the construction of tornado / thunderstorm wind safe rooms in the schools of USD #469 in Lansing.

Background / Benefits

Schools are particularly vulnerable to potential damage from tornadoes and high winds. Students, faculty, and staff should seek safe shelter when a tornado or thunderstorm winds threatens. Safe rooms should be constructed in schools of USD 469 to ensure a safe place for students to go during a tornado or thunderstorm wind event. Safe rooms may be funded during new school construction, as part of school additions, or as retrofits.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 2.4, 3.1, 3.2, | FEMA | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Prevention | Easton | Flood | High | City of Easton | | December 31, 2015 | | 0 |

Initiative (Action)

1. Identify flash-flood prone areas to consider flood reduction measures to city officials / county planners.

Background / Benefits

Flood zone mapping has provided initial identification of potential hazard areas that can be reviewed with other data sources, such as the watershed districts goals and objectives, in developing long range planning activities for flood prevention, or other planning steps to reduce exposure to this hazard.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.1, 2.1, | Local | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Emergency Services | University of St. Mary | Multi-Hazard | Moderate | University of St. Mary / City of Leavenworth / Leavenworth County | | December 31, 2015 | | 0 |

Initiative (Action)

2. Appoint a committee to develop a radio communications plan between campus security units and outside agencies of Leavenworth County and the City of Leavenworth to ensure interoperability between all communities. The Plan should address equipment compatibility and upgrade requirements to implement the Plan.

Background / Benefits

The University of St. Mary has identified a need to implement interoperable radio communications between its security staff and county and city services in case of campus emergency.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.3, 4.1, | Local / State / Federal | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Prevention | Easton | Flood | Moderate | City of Easton | | December 31, 2012 | | 0 |

Initiative (Action)

2. Seek funding to raise the casings around the potable water wells utilized by the City of Easton to protect them from flood water contamination.

Background / Benefits

The City of Easton has historically experienced flooding events that have, on occasion, resulted in potable water contamination due to flood waters impacting the water wells utilized by the City of Easton.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.1, 1.2, 2.1, 4.1, | Local / State / Federal | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Public Information and Awareness | Tonganoxie | Flood | Moderate | City of Tonganoxie Planner | | December 31, 2015 | | 0 |

Initiative (Action)

2. Develop and fund professional services to augment the City of Tonganoxie's GIS capability to provide condition investigation, analysis of streamways, develop stream buffer mapping, provide updated 2 ft. interval hypsography for the entire Tonganoxie growth area to allow for improved storm water modeling and management, draft a stream buffer zoning ordinance for the city, produce digital 2 ft. contour mapping for use in storm water analysis and planning, and develop interactive floodplain and property parcel GIS application and database for use by city staff.

Background / Benefits

Utilization of GIS capabilities should be expanded to include the use of ArcInfo and AutoCad format for various flood-related projects throughout the City of Tonganoxie and the Tonganoxie Growth Area.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.1, 1.2, 4.1, | Local / State / Federal | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Prevention | Basehor | Ice Storm | Moderate | City of Basehor | | Continuous | | 0 |

Initiative (Action)

2. Incorporate the inspection and management of trees into the city maintenance program that may pose a threat to the electrical lines that could result in power outages during ice storms.

Background / Benefits

Significant amounts of property damage occur during ice storms that result from tree failure. Trees that fall into utility lines have additional serious consequences such as causing power outages, surges, fires and other damage. The jurisdiction's ability to recognize and prevent hazardous tree conditions (through inspection, pruning or removal) is the best defense against problems and costly damages resulting from tree failure. Specifically, trees located on jurisdictional property, which pose immediate threats to property, utility lines and other critical facilities should be addressed.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.3, 3.1, 3.2, | Local / State / Federal | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Prevention | USD 469 | Terrorism / Agri-Terrorism / Civil Disorder | Moderate | Board of Education / School Superintendent | | December 31, 2015 | | 0 |

Initiative (Action)

2. Seek funding to retain a professional school safety and security firm to review and update the school's Security Plan for domestic acts of terrorism, building security, and contagious disease response.

Background / Benefits

As domestic acts of terrorism are becoming more of reality, many officials believe that the next wave of terrorists acts may be aimed at public school systems. Although these events are impossible to predict with great accuracy, updating building security, school security plans, and USD emergency plans can prepare school districts such as USD 469 for these events. Companies such as the National School Safety and Security Services provide the expertise in this field to help review and upgrade plans for the district.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.3, 3.1, | Local / State / Federal | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Prevention | USD 464 | Multi-Hazard | Moderate | School District | | December 31, 2015 | | 0 |

Initiative (Action)

2. Obtain funding for the purchase and installation of backup power generators for the schools of USD 464.

Background / Benefits

USD 464 has identified a need to quickly restore power in all of its schools in the event of a weather event and the subsequent loss of power.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 3.1, 3.2, | Local / State / Federal | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Prevention, Property Protection | USD 458 | Flood | Moderate | School District | | December 31, 2015 | | 0 |

Initiative (Action)

2. Assess elevations and water flow in the district to qualify the benefit of flood control projects in the District.

Background / Benefits

The Basehor-Linwood Unified School District #458 would like to analyze the potential benefits of constructing soil-based berms, and other flood control projects, around various facilities in the district to mitigate the effects from flooding.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.1, 3.1, 3.2, | Local / State / Federal | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Prevention | Leavenworth (UnInc.) | Flood | High | Planner / Flood Plain Administrator | | Continuous | | 0 |

Initiative (Action)

2. Regularly calculate and document the amount of flood prone property that is preserved as open space to reduce flood insurance burden to the county.

Background / Benefits

CRS credit is given for areas that are permanently preserved as open space. Although credit is not given for federal lands, the jurisdiction maintains floodplain areas preserved as open space through land acquisition projects (i.e., HMGP), which protect parcels from development through deed restrictions. The jurisdiction also has floodplain land within state parks or otherwise preserved as wildlife and natural preserves, which does qualify for additional CRS credit.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.1, 1.2, 2.1, 2.2, | N/A | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Emergency Services | Linwood | Tornado | Moderate | Local Officials | | December 31, 2015 | | 0 |

Initiative (Action)

2. Conduct a study to determine the efficacy of the existing warning siren system within the Jurisdiction, and repair and install new sirens as needed to ensure area coverage.

Background / Benefits

Reduce the possibility of damages and loss of life to the citizens by maintaining and upgrading the early warning system for the City of Linwood.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.2, 1.3, | Local | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Property Protection | Lansing | Multi-Hazard | Moderate | Planning and Zoning Department | | December 31, 2015 | | 0 |

Initiative (Action)

2. Research funding options to construct storm shelters for existing mobile home parks in the City of Lansing that currently do not have storm shelters or have inadequate storm shelters.

Background / Benefits

Mobile homes are particularly vulnerable to damage from high winds. Residents, even those who live in mobile homes with tie-downs, should seek safe shelter when a tornado threatens. Tornado shelters should be constructed in major mobile home parks to ensure a safe place for residents to go during a tornado event. The shelter structure, which should be designed to withstand a minimum of 120mph winds, could easily serve an alternate purpose such as a community center, laundry facility, etc. Tornado shelters should be for last minute protection for high wind events. Mobile Home Courts that currently do not have storm shelters or have inadequate storm shelters were identified as Wiley Mobile Home Court, Clear Creek Court, Black's Mobile Home Court, and Parkwood Court Manufactured Home Court.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 2.4, 3.1, | Local / State / Federal | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Property Protection | Leavenworth | Flood | Moderate | City of Leavenworth | | December 31, 2015 | | 0 |

Initiative (Action)

2. Reduce danger and damage from repetitive flooding events by developing a program to acquire residential and commercial properties in coordination with FEMA acquisition programs.

Background / Benefits

There has been a history of repetitive flooding of residential and commercial buildings in several locations in the City of Leavenworth. Flooding events occur in these areas due to a sustained duration of high-intensity rainfall and to elevated water levels of the Missouri River, Three Mile Creek, and a tributary of Five Mile Creek. This has caused significant danger to both residents and emergency personnel, as well as damage to homes and businesses. Flooding in these areas is related to sustained duration of high intensity rainfall as well as high water in the Missouri River. These residential and commercial properties were flooded in 1985, 1993, 1998, and 2005, as well as 13 additional historic flood events. The City of Leavenworth has identified these properties as 35 residential structures, at an estimated acquisition cost of $2,450,220, and 22 commercial structures, at an estimated acquisition cost of $2,007,570. One residential structure and one commercial structure appear on the Repetitive Loss Properties list for the City of Leavenworth and are reported to have flood insurance; the remaining structures targeted for acquisition activities by the City of Leavenworth do not appear to have flood insurance and do not appear on the Repetitive Loss Properties list for the City of Leavenworth.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.1, 1.2, 2.1, | Local/State/Federal | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Public Information and Awareness | MultiJurisdictional | Flood | High | County Planners / City Officials | | Continuous | | 0 |

Initiative (Action)

2. Contact owners identified in high-risk flood areas and inform them of potential availability of assistance through the Federal Flood Mitigation Assistance (FEMA) program, in addition to other flood protection measures.

Background / Benefits

Property owners should be contacted every year to promote the availability of the FEMA funding and to determine their level of interest in applying for the program.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.1, 2.1, 3.1, 4.1, | Local | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Public Information and Awareness | MultiJurisdictional | Flood | High | County Planners / City Officials | | Continuous | | 0 |

Initiative (Action)

3. Advertise and promote the availability of flood insurance to property owners by direct mail once a year.

Background / Benefits

Leavenworth County, including the cities of Leavenworth, Lansing, Basehor, Easton, Tonganoxie, and Linwood, participates in the National Flood Insurance Program (NFIP). There are currently 214 policies in effect, with a total coverage amount of $41,122,700. Since the jurisdiction joined the program, there have been 197 claims paid for a total loss paid amount of $2,260,341. (Source: FEMA, 2008). NFIP flood insurance policies protect property owners by offering affordable rates for protecting both structures and contents.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.1, 4.1, | Local | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Prevention | Leavenworth (UnInc.) | Flood | High | Planner | | December 31, 2015 | | 0 |

Initiative (Action)

3. Identify flash-flood prone areas to consider flood reduction measures to county planners.

Background / Benefits

Flood zone mapping will provide initial identification of potential hazard areas that can be reviewed with other data sources, such as the watershed districts goals and objectives, in developing long range planning activities for flash-flood prevention, or other planning steps to reduce exposure to this hazard.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.1, 1.2, 2.1, | Local | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Property Protection | Leavenworth | Flood | Moderate | City of Leavenworth | | December 31, 2015 | | 0 |

Initiative (Action)

3. Seek funding to purchase a portable dam system to reduce exposure from flooding to the Leavenworth Community Center.

Background / Benefits

The Leavenworth Community Center, located at 123 South Esplanade, is listed on the National Register of Historic Places, and is a focal point of social and community activity in the City. Flooding events are attributed to elevated water levels of the Missouri River. The building was flooded in 1951; was protected from flooding in 1993 by a large sandbag wall; and protected by a rented portable dam system in 2007. Given its location and flood history, it is expected to be threatened by flooding in the future. Flooding of this building will damage a historic structure and repair costs are expected to be significant.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.1, 1.2, | Local/State/Federal | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Public Information and Awareness | Lansing | Flood | Moderate | City of Lansing GIS Department | | December 31, 2015 | | 0 |

Initiative (Action)

3. Develop and fund professional services to augment the City of Lansing's GIS capability to provide condition investigation, analysis of streamways, develop stream buffer mapping, provide updated 2 ft. interval hypsography for the entire Lansing growth area to allow for improved storm water modeling and management, draft a stream buffer zoning ordinance for the city, produce digital 2 ft. contour mapping for use in storm water analysis and planning, and develop interactive floodplain and property parcel GIS application and database for use by city staff.

Background / Benefits

Utilization of GIS capabilities should be expanded to include the use of ArcInfo and AutoCad format for various flood-related projects throughout the City of Lansing and the Lansing Growth Area.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.1, 1.2, 4.1, | Local / State / Federal | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Prevention | USD 464 | Terrorism / Agri-Terrorism / Civil Disorder | Moderate | Board of Education / School Superintendent | | December 31, 2015 | | 0 |

Initiative (Action)

3. Seek funding to retain a professional school safety and security firm to review and update the school's Security Plan for domestic acts of terrorism, building security, and contagious disease response.

Background / Benefits

As domestic acts of terrorism are becoming more of reality, many officials believe that the next wave of terrorists acts may be aimed at public school systems. Although these events are impossible to predict with great accuracy, updating building security, school security plans, and USD emergency plans can prepare school districts such as USD 464 for these events. Companies such as the National School Safety and Security Services provide the expertise in this field to help review and upgrade plans for the district.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.3, 3.1, | Local / State / Federal | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Prevention | Basehor | Multi-Hazard | Moderate | City of Basehor | | December 31, 2015 | | 0 |

Initiative (Action)

3. Determine the efficacy of the existing generators located within Critical Facility structures, including the City Hall / Police Department, and consider funding options for any Critical Facilities that may require generators and/or transfer switches to maintain power in the event of severe weather events.

Background / Benefits

Ensure that Critical Facilities located within the City of Basehor maintain power during severe weather events.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.3, 3.1, 3.2, | Local / State / Federal | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Prevention | Tonganoxie | Flood | Moderate | City of Tonganoxie | | December 31, 2015 | | 0 |

Initiative (Action)

3. Research funding options for professional services and construction of stream bank stablization on Tonganoxie Creek within the city limits of Tonganoxie.

Background / Benefits

The City of Tonganoxie has identified a need for professional services and construction for stream bank stabilization at various locations on Tonganoxie Creek where bank erosion threatens public utilities or private improvements.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.2, 3.1, 4.1, | Local / State / Federal | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Prevention | Easton | Multi-Hazard | High | City of Easton | | December 31, 2012 | | 0 |

Initiative (Action)

3. Consider funding options for the purchase and installation of a backup generator for the City of Easton Water Treatment Plant in the event of severe weather events.

Background / Benefits

The City of Easton has identified a need to ensure that the Water Treatment Plant in Easton maintain power during severe weather events, to ensure the quality of the water supplied to the city.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.2, 1.3, 3.1, 3.2, | Local / State / Federal | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Emergency Services | University of St. Mary | Multi-Hazards | Moderate | University of St. Mary | | December 31, 2015 | | 0 |

Initiative (Action)

3. Appoint a committee to research and implement enhancement to the University's early warning systems for students and staff for weather alerts and campus emergencies. Enhancements may include a campus website identifying emergencies on campus.

Background / Benefits

The University of St. Mary has identified a need to enhance the University's ability to issue early warnings for students and staff for weather events or campus emergencies in an effective, dependable, and rapid manner.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.3, 4.1, | Local / State / Federal | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Prevention | Easton | Flood | Moderate | City of Easton | | December 31, 2015 | | 0 |

Initiative (Action)

4. Consider funding options for the purchase and installation of control valves for the City of Easton Water Treatment Plant and storage facility in the event of flooding events.

Background / Benefits

The City of Easton has identified a need to protect the potable water supply system from flooding events between the city water treatment plant and storage facility. There is a concern of contaminates from flooding resting in the supply line.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.2, 1.3, 3.1, 3.2, | Local / State / Federal | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Prevention | Tonganoxie | Flood | Moderate | City of Tonganoxie Engineer | | December 31, 2015 | | 0 |

Initiative (Action)

4. Research and fund engineering services for a city-wide storm water infrastructure-needs assessment.

Background / Benefits

The City of Tonganoxie has identified the need for professional services to perform a storm water infrastructure needs assessment throughout the City of Tonganoxie.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.1, 1.2, 3.1, 3.2, | Local / State / Federal | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Structural Projects | Basehor | Multi-Hazard | Moderate | City of Basehor | | December 31, 2015 | | 0 |

Initiative (Action)

4. Seek funding to retain an engineer to design a safe room within the City of Basehor City Hall / Police Department and apply for grant funding for construction of the safe room within the new facility when constructed.

Background / Benefits

A lack of safe rooms poses a serious risk to the community. The City of Basehor has identified a need for a safe room within the Basehor City Hall / Police Department when constructed.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 2.4, 3.1, | Local / State / Federal | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Property Protection | Lansing | Dam / Levee | Moderate | City of Lansing | | December 31, 2015 | | 0 |

Initiative (Action)

4. Conduct engineering studies for design and construction of levees to protect several areas within the Lansing city limits from flooding events.

Background / Benefits

The City of Lansing has identified a need for the construction of levees to protect the Rock Creek West/Rock Creek West #5 neighborhood and the Fawn Valley Replat neighborhood from flooding events.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.1, 1.2, 3.1, | Local / State / Federal | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Property Protection | Leavenworth | Flood | Moderate | City of Leavenworth | | December 31, 2015 | | 0 |

Initiative (Action)

4. Seek funding to purchase a portable dam system to reduce exposure from flooding to the City of Leavenworth Wastewater Treatment Plant.

Background / Benefits

The City of Leavenworth Wastewater Treatment Plant, located on South 2nd Street, suffers flooding events primarily related to the elevation of the Missouri River. It is also subject to flooding if a high-intensity event occurs in the Five Mile Creek drainage basin while the Missouri River elevations are up. The facility suffered extensive flood damage in 1993. The facility was expected to be flooded in 2007 and was protected by a sandbag wall. Flood damage to the facility causes untreated wastewater to be discharged to the Missouri River; repair costs are estimated to be significant.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.1, 1.2, | Local/State/Federal | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Prevention | Leavenworth (UnInc.) | Flood | High | Planning Commission / Planner | | December 31, 2015 | | 0 |

Initiative (Action)

4. Amend the Floodplain Management Ordinance to include a “no-rise (in base flood elevation)” clause for Leavenworth County.

Background / Benefits

Many floodplain permitting systems, including those that meet National Flood Insurance Program standards, allow projects outside the floodway to increase base flood elevations by up to one foot. While this may not represent a significant increase for just one project, the cumulative impact of a number of projects in the same floodplain can be significant. By prohibiting any rise throughout the 100-year floodplain, a “no rise” clause ensures that the cumulative impact of multiple permitted projects will not cause flood elevations to rise to unacceptable levels.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.1, 2.1, 2.2, | N/A | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Public Information and Awareness | MultiJurisdictional | Multi-Hazard | High | Chamber of Commerce/ Emergency Management/ City Officials | | Continuous | | 0 |

Initiative (Action)

4. Collect educational materials on individual and family preparedness / mitigation measures for property owners, and display at both the library and routinely visited government offices.

Background / Benefits

FEMA, the Kansas Division of Emergency Management, the National Weather Service and other agencies provide information brochures and pamphlets on property protection measures at no cost to local governments.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.1, 4.1, 4.2, 4.3, | Local | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Public Information and Awareness | MultiJurisdictional | Multi-Hazard | High | City and County Planners / Emergency Management | | Continuous | | 0 |

Initiative (Action)

5. Annually host a public “hazards workshop” in combination with local festivals, fairs, or other appropriate events.

Background / Benefits

A hazard workshop for county residents should be added to an established event drawing large crowds. The workshop should be geared toward educating them on the hazards that threaten Leavenworth County, and the mitigation and preparedness measures available to protect them. Guest speakers from the National Weather Service, the Kansas Division of Emergency Management, and other relevant agencies should be invited to attend, and educational displays/handouts should be provided such as Flood Insurance Rate Maps, FEMA publications, safety tips, etc.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 4.1, 4.2, 4.3, | Local | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Natural Resource Protection | Leavenworth (UnInc.) | Flood | High | Planning Commission / Planner | | December 31, 2015 | | 0 |

Initiative (Action)

5. Research and design an appropriate stream buffer ordinance to further protect the jurisdiction’s water resources and to limit future flood damages adjacent to major waterways.

Background / Benefits

Riparian buffers serve as natural boundaries between local waterways and existing development and help protect resources by filtering pollutants, providing flood control, alleviating streambank erosion, mitigating stream warming, and providing room for lateral movement of the stream channel. Buffer widths can vary greatly depending upon stream channel size and the intended purpose of the buffer, but 50-100 feet is generally considered to be sufficient for purposes of bank stabilization and sediment control. Many communities require 200 feet for flood control purposes. Special consideration should be given to Stranger Creek, while exempting Leavenworth County’s agricultural operations from buffer regulations.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.1, 2.1, 2.2, | FEMA/State/Local | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Structural Projects | Leavenworth | Flood | Low | City of Leavenworth | | December 31, 2015 | | 0 |

Initiative (Action)

5. Seek funding to construct a new City of Leavenworth Animal Control Shelter Building to replace the existing structure which is susceptible to repeated flooding events.

Background / Benefits

The City of Leavenworth Animal Control Shelter Building, located on South 2nd Street, suffers flooding events primarily related to the elevation of the Missouri River. It is also subject to flooding if a high-intensity event occurs in the Five Mile Creek drainage basin while the Missouri River elevations are up. The facility suffered extensive flood damage in 1993. The facility was predicted to be flooded in 2007 and was protected by a sandbag wall. Damage to the Animal Control building causes significant disruption of service for animal control activities in Leavenworth and Leavenworth County. This facility serves as an animal shelter and alternative housing for the animals, who must be relocated each time it is threatened with flooding.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|

| | | | |
|---|---|---|---|
| 1.1, 1.2, 2.1, | Local/State/Federal | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Prevention | Lansing | Flood | Moderate | City of Lansing Public Works Department | | December 31, 2015 | | 0 |

Initiative (Action)

5. Conduct engineering studies for the design and reconstruction of an engineered storm water channel within the city limits of Lansing.

Background / Benefits

The City of Lansing has identified the need for design and reconstruction of the engineered storm water channel located in the Holiday Hills neighborhood.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.1, 1.2, 3.1, | Local / State / Federal | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Emergency Services | Basehor | Multi-Hazard | Moderate | City of Basehor | | December 31, 2015 | | 0 |

Initiative (Action)

5. Develop a radio communications plan between the City of Basehor Public Works Department / Street Department and City Hall to ensure interoperability between entities. The communications plan should address equipment compatibility and upgrade requirements to implement the plan.

Background / Benefits

The City of Basehor has identified a need to implement interoperable radio communications between the Public Works Department / Street Department and City Hall.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.3, 4.1, | Local / State / Federal | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Property Protection | Easton | Flood | Moderate | City of Easton | | December 31, 2015 | | 0 |

Initiative (Action)

5. Reduce danger and damage from repetitive flooding events, as well as allowing possible annexation of the City of Easton, by developing a program to acquire residential and commercial properties in coordination with FEMA acquisition programs.

Background / Benefits

There has been a history of repetitive flooding of residential and commercial buildings in the City of Easton. Flooding events occur in the area due to a sustained duration of high-intensity rainfall and to elevated water levels of the Stranger Creek and Dawson Creek . This has caused significant danger to both residents and emergency personnel, as well as damage to homes and businesses. There are 17 structures identified on the Repetitive Loss Properties list for the City of Easton and are reported to have flood insurance. Two of the structures were identified as having been mitigated. In total, 28 residents of the City of Easton have flood insurance with coverage of $3,550,000. The City of Easton has had 111 claims since 1978 totaling $1,461,919.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.1, 1.2, 2.1, | Local / State / Federal | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Prevention | Tonganoxie | Flood | Moderate | City of Tonganoxie | | December 31, 2015 | | 0 |

Initiative (Action)

5. Seek contractors proposal to perform maintenance activities along Tonganoxie Creek within the city limits of Tonganoxie.

Background / Benefits

The City of Tonganoxie has identified a need for contractor removal or deadfall and/or log jams from Tonganoxie Creek within the city limits of Tonganoxie.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.1, 1.2, 3.1, 4.1, | Local / State / Federal | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Prevention | Tonganoxie | Flood | Moderate | City of Tonganoxie | | December 31, 2015 | | 0 |

Initiative (Action)

6. Seek contractors proposal to perform storm water quality monitoring in the City of Tonganoxie.

Background / Benefits

The City of Tonganoxie has identified a need to have a contractor perform storm water quality monitoring on a routine basis within the City of Tonganoxie.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.1, 1.2, 3.1, 3.2, 4.1, | Local / State / Federal | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Structural Projects | Easton | Tornado | Moderate | City of Easton | | December 31, 2015 | | 0 |

Initiative (Action)

6. Seek funding to retain an engineer to design community tornado shelters and apply for grant funding for construction.

| Background / Benefits | | | |
|---|---|---|---|
| A lack of tornado shelters poses a serious risk to the safety of the community. The City of Easton has identified a need for Community Storm Shelters. | | | |
| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
| 2.4, 3.1, | Local / State / Federal | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Emergency Services | Basehor | Multi-Hazard | Moderate | City of Basehor | | December 31, 2015 | | 0 |

| Initiative (Action) |
|---|
| 6. Seek funding options for the purchase of a brine applicator and mixer to apply chemicals to roads within the City of Basehor prior to major winter storm events, including ice storms. |
| Background / Benefits |
| The City of Basehor has identified a need for a brine applicator and mixer to assist in maintaing safe roads within the city during major winter storm events. |

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.3, 3.2, | Local / State / Federal | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Prevention | Lansing | Flood | Moderate | City of Lansing Public Works Department | | December 31, 2015 | | 0 |

| Initiative (Action) |
|---|
| 6. Research and fund engineering services for a city-wide storm water infrastructure-needs assessment. |
| Background / Benefits |
| The City of Lansing has identified the need for professional services to perform a storm water infrastructure needs assessment throughout the City of Lansing. |

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.1, 1.2, 3.1, 3.2, | Local / State / Federal | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Prevention | Leavenworth (UnInc.) | Flood | High | Planner/Emergency Management | | December 31, 2015 | | 0 |

| Initiative (Action) |
|---|
| 6. Identify levee owners in the jurisdiction. |
| Background / Benefits |
| Early in the implementation of Flood Map Modernization (Map Mod), the Department of Homeland Security's Federal Emergency Management Agency (FEMA) recognized that the role of levees in flood risk reduction would be an important part of the efforts of Map Mod. Further, it was acknowledged that the condition of levees had not been assessed since they were originally mapped as providing base (1-percent-annual-chance) flood protection. Because of this, FEMA initiated a revised process to gain a better understanding of the actual flood risks for those citizens living and working behind levees nationwide. Often, documentation regarding levee design, accreditation, and the impacts on flood hazard mapping is outdated or missing altogether. Identifying levee owners and developing initiatives for certifying levees may help reduce overall risk to life and property in the community. |

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.1, 1.2, 3.2, 4.1, | Local | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Natural Resources Protection | MultiJurisdictional | Terrorism/AT/CD | High | County Health Department/ County Emergency Management/ County Extension/ Local Producers | | Continuous | | 0 |

| Initiative (Action) |
|---|
| 6. Promote and educate the jurisdiction's public and private sectors on potential agricultural terrorism and bio-terrorism issues that can severely impact the county and regional economies, and develop and implement plans to address these issues. |
| Background / Benefits |
| Leavenworth County is basically an agricultural community. A natural or intentional introduction of a foreign animal disease would be devastating to the local, regional state, economies. This annex will be added to the Local Emergency Operations Plan, a separate part of the plan addressing FAD, with additional annexes developed in the future to address other types of terrorism. |

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 4.3, | Local / State/ Local | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Property Protection | MultiJurisdictional | Flood | High | Emergency Management / City Officials | | Continuous | | 0 |

| Initiative (Action) |
|---|
| 7. The County and local governments will work with the Kansas Department of Agriculture - Division of Water Resources to educate and promote local jurisdictional participation in the National Flood Insurance Program's Community Rating System (CRS). |
| Background / Benefits |
| The Kansas Division of Water Resources provides local training and education on the benefits of participation in the NFIP. The program provides availability of flood |

insurance to individuals whose local governments participate in the program. Flood insurance claims are paid even if a disaster is not declared by the President, and there is no payback requirement. Flood insurance policies are continuous, and are not non-renewed or cancelled for repeat losses.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.1, 1.2, 2.1, | Local/ State | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Property Protection | Leavenworth (UnInc.) | Flood | Moderate | Planner | | December 31, 2015 | | 0 |

Initiative (Action)

7. Implement a study to determine the residual flood risk in levee-protected areas.

Background / Benefits

Levee owners or communities have the responsibility to provide documentation that a levee meets the requirements of Title 44 of the Code of Federal Regulations, Section 65.10 of the national Flood Insurance Program regulations (44CFR Section 65.10), as part of a study/mapping project. Without the required documentation necessary to comply with 44 CFR Section 65.10, the area behind the levee will be re-delineated and mapped as Special Flood Hazard Area (SFHA) on the Digital Flood Insurance Rate Map (DFIRM). Procedure Memorandum No. 34 allows for the issuance of a deadline to the community for submitting the required documents.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.1, 1.2, 3.2, 4.1, | Local | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Prevention | Lansing | Flood | Moderate | City of Lansing | | December 31, 2015 | | 0 |

Initiative (Action)

7. Research funding options for professional services and construction of stream bank stablization on Nine Mile Creek and Seven Mile Creek within the city limits of Lansing.

Background / Benefits

The City of Lansing has identified a need for professional services and construction for stream bank stabilization at various location on Nine Mile Creek and Seven Mile Creek where bank erosion threatens public utilities or private improvements.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.2, 3.1, 4.1, | Local / State / Federal | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Emergency Services | Basehor | Multi-Hazard | Moderate | City of Basehor | | December 31, 2015 | | 0 |

Initiative (Action)

7. Seek funding options for the purchase of equipment to assist in the removal of debris and assist with cleanups after major storms.

Background / Benefits

The City of Basehor has identified the need for equipment to be utilized in the removal of debris and cleanup after major storms within the city limits. Equipment needed includes a Case 580 Super M Series 3 4x4 extended backhoe with grapple bucket; a Polaris Ranger 800 HD utility vehicle; and a 2010 F-450 Ford 4x4 diesel truck with dump bed.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.3, 3.1, 3.2, 4.1, | Local / State / Federal | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Prevention | Tonganoxie | Ice Storm | Moderate | City of Tonganoxie | | Continuous | | 0 |

Initiative (Action)

7. Incorporate the inspection and management of trees into the city maintenance program that may pose a threat to the electrical lines that could result in power outages during ice storms.

Background / Benefits

Significant amounts of property damage occur during ice storms that result from tree failure. Trees that fall into utility lines have additional serious consequences such as causing power outages, surges, fires and other damage. The jurisdiction's ability to recognize and prevent hazardous tree conditions (through inspection, pruning or removal) is the best defense against problems and costly damages resulting from tree failure. Specifically, trees located on jurisdictional property, which pose immediate threats to property, utility lines and other critical facilities should be addressed.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.3, 3.1, 3.2, | Local / State / Federal | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Structural Projects | Easton | Flooding | Moderate | City of Easton / Leavenworth County / State of Kansas | | December 31, 2015 | | 0 |

Initiative (Action)

7. Conduct an engineering study, in association with the State of Kansas, to examine the feasibility of raising the State highway 300 yards east of First Street to the twin bridges over Stranger Creek.

Background / Benefits

The City of Easton has historically experienced flooding events, often resulting in the flooding of the State Highway leading in and out of the city, leaving residents and commercial without an egress to the city, resulting in economic loss to the community. The relocation of the State Highway to the twin bridges over Stranger Creek would allow residents and commercial commodities to travel through the community during flooding events.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| | | | |

| | | | |
|---|---|---|---|
| 1.1, 1.2, 2.1, 3.2, 4.1, | Local / State / Federal | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Emergency Services | Tonganoxie | Tornado | Moderate | Local Officials | | December 31, 2015 | | 0 |

Initiative (Action)

8. Conduct a study to determine the efficacy of the existing warning siren system within the Jurisdiction, and repair and install new sirens as needed to ensure area coverage.

Background / Benefits

Reduce the possibility of damages and loss of life to the citizens by maintaining and upgrading the early warning system for the City of Tonganoxie.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.2, 1.3, | Local | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Prevention | Lansing | Flood | Moderate | City of Lansing | | December 31, 2015 | | 0 |

Initiative (Action)

8. Seek contractors proposal to perform maintenance activities along Nine Mile Creek and Seven Mile Creek within the city limits of Lansing.

Background / Benefits

The City of Lansing has identified a need for contractor removal or deadfall and/or log jams from Nine Mile Creek and Seven Mile Creek within the city limits of Lansing.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.1, 1.2, 3.1, 4.1, | Local / State / Federal | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Property Protection | Leavenworth (UnInc.) | Multi-Hazard | Moderate | Emergency Management | | December 31, 2015 | | 0 |

Initiative (Action)

8. Identify the county's most at-risk critical facilities, and evaluate potential mitigation techniques for protecting each facility to the maximum extent possible.

Background / Benefits

A thorough evaluation of potential mitigation opportunities for Leavenworth County's critical facilities must still be completed. Currently, there is very little available data on these facilities. An inventory/database on critical facilities should be created and maintained by the county and shared with the Kansas Division of Emergency Management. This inventory should include information on the location and risk to each facility, and should also document any cost-effective mitigation techniques to consider when funding becomes available.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.2, 3.1, 3.2, 4.1, | Local | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Prevention | MultiJurisdictional | Multi-Hazard | Moderate | Water Departments / Water Districts | | December 31, 2015 | | 0 |

Initiative (Action)

8. Establish, promote, and fund continuity of water systems between rural water districts to larger water departments to manage future growth in the county.

Background / Benefits

The rural water districts are in need to have some connectivity to larger municipal water departments to continue growth, and also to assure continuous water supply to all districts if one district is jeopardized with lost of water or contamination of the supply. Seek funding through Federal and State grants to accomplish this task.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 3.1, 3.2, | Local/State/Federal | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Emergency Services | Leavenworth (UnInc.) | Multi-Hazard | Moderate | Emergency Management/GIS | | December 31, 2015 | | 0 |

Initiative (Action)

9. Conduct an inventory/survey for the county's emergency response services to identify any existing needs or shortfalls in terms of personnel, equipment or required resources.

Background / Benefits

A survey should be completed in order to verify the county's current emergency services are adequate to protect public health and safety from most probable hazard events. Any identified needs or shortfalls should become documented and result in specific recommendations to the County Commission for emergency service enhancements.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.2, 1.3, | Local/State | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Prevention | Lansing | Flood | Moderate | City of Lansing | | December 31, 2014 | | 0 |

Initiative (Action)

9. Seek contractors proposal to perform storm water quality monitoring in the City of Lansing.

Background / Benefits

The City of Lansing has identified a need to have a contractor perform storm water quality monitoring on a routine basis within the City of Lansing.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.1, 1.2, 3.1, 3.2, 4.1, | Local / State / Federal | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Property Protection | MultiJurisdictional | Tornado | High | School Districts / City Officials / State of Kansas / FEMA | | Continuous | | 0 |

Initiative (Action)

9. Encourage the construction of safe rooms and storm shelters in public and private schools, day care centers and senior care facilities.

Background / Benefits

When severe weather threatens, individuals and families need advance warning and protection from the dangerous forces of extreme winds. Individuals and communities in high-risk tornado and hurricane areas need structurally sound shelters and early alert systems.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 2.3, 2.4, 3.1, 3.2, | FEMA/State/Local | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Prevention | Tonganoxie | Multi-Hazard | Moderate | City of Tonganoxie Fire Chief / EMS | | December 31, 2015 | | 0 |

Initiative (Action)

9. Create a working group to assess the county's firefighting / EMS resources to identify any existing needs or shortfalls in terms of personnel, equipment or additional required resources.

Background / Benefits

A survey should be completed in order to verify the county's current firefighting / EMS resources are adequate for public safety. Any identified needs or shortfalls should become documented and result in specific recommendations to the County Commission for firefighting enhancements.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.3, 1.4, 4.1, | Local / State / Federal | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Structural Projects | Tonganoxie | Tornado | Moderate | City of Tonganoxie | | December 31, 2015 | | 0 |

Initiative (Action)

10. Seek funding to retain an engineer to design a safe room within the City of Tonganoxie City Hall or Fire Station and apply for grant funding for construction.

Background / Benefits

A lack of tornado shelters poses a serious risk to the community, including City of Tonganoxie employees. The City of Tonganoxie has identified a need for a safe room within the existing Tonganoxie City Hall or Fire Station.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 2.4, 3.1, | Local / State / Federal | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Emergency Services | MultiJurisdictional | Multi-Hazard | Moderate | Leavenworth County Emergency Management / Emergency Services | | December 31, 2015 | | 0 |

Initiative (Action)

10. Prepare and adopt an Outdoor Warning Sirens Plan for the county, including consideration of the unique geographical locations, technical requirements, system types and operational procedures of each local jurisdiction. The plans should include a review of existing outdoor warning siren coverage and recommend new locations if and where there are coverage gaps. Seek funding to install new warning sirens in accordance with the plan recommendations.

Background / Benefits

Some communities and rural areas of the county have older warning systems or none at all. To better serve the citizens of Leavenworth County, a study should be conducted to evaluate measures to be taken to improve overall emergency warning services.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.3, 3.1, 3.2, 4.1, | Local / State / Federal | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Property Protection | Leavenworth (UnInc.) | Multi-Hazard | High | Planning and Zoning Department | | December 31, 2015 | | 0 |

Initiative (Action)

10. Research, develop, and recommend an ordinance/resolution to require installation of tornado shelters for major manufactured and/or mobile home parks with more than 10 mobile home spaces.

Background / Benefits

Mobile homes are particularly vulnerable to damage from high winds. Residents, even those who live in mobile homes with tie-downs, should seek safe shelter when a tornado threatens. Tornado shelters should be constructed in major mobile home parks to ensure a safe place for residents to go during a tornado event. The shelter structure, which should be designed to withstand a minimum of 120mph winds, could easily serve an alternate purpose such as a community center,

laundry facility, etc. Tornado shelters should be for last minute protection for high wind events.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 2.3, 2.4, | N/A | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Emergency Services | Leavenworth (UnInc.) | Wildfire | Moderate | Fire Officials/ Emergency Managment | | December 31, 2015 | | 0 |

Initiative (Action)

11. Evaluate the firefighting water supply resources within the County. This should include both fixed and mobile supply issues.

Background / Benefits

Lack of sufficient water supply makes it difficult for firefighters to suppress fires. Whenever possible, increasing access to water along water service delivery lines (wet and dry hydrants) would provide additional resources for emergency responders.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.3, 1.4, | Local | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Public Information and Awareness | Leavenworth (UnInc.) | Wildfire | High | Rural Fire/ Emergency Management | | December 31, 2015 | | 0 |

Initiative (Action)

12. Distribute assessment report examples provided by the Kansas Forest Service to applicable parties to develop an understanding of the Community Wildfire Protection Plan (CWPP). Recommend joining the program and completing an assessment report for approval.

Background / Benefits

The probability of grass/cropland fire in Leavenworth County is relatively high. With over 58-years of history, the likelihood of future events is estimated to remain the same as currently calculated. Leavenworth County can expect an average of 11.03 significant wildfires per year that damage or destroy a total of 292.83 acres annually. The Kansas Forest Service staff would provide assistance to interested communities in the form of a Community Wildfire Hazard Assessment Report and some mitigation action items.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.2, 1.4, 4.2, | Local/ State/ Federal grant programs | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Public Information and Awareness | Leavenworth (UnInc.) | Wildfire | Moderate | Fire Officials / Emergency Management | | Continuous | | 0 |

Initiative (Action)

13. Develop and implement a wildfire prevention/education program. In addition to providing education to the general public, the program should also target children, fire and equipment users, builders and developers, and homeowners.

Background / Benefits

Leavenworth County has burn-ban resolutions which require special permission to conduct open burning operations. In periods of drought or extreme weather conditions a burn ban may be declared. When a ban is declared all radio stations, TV stations, and regional newspapers in the area are notified as well as mayors, fire chiefs, etc. To better educate the public at large, Leavenworth County should expand their existing fire protection program to include wildfire workshops to all age groups and commercial operations.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.4, 4.1, 4.2, | Local | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Emergency Services | Leavenworth (UnInc.) | Wildfire | High | Fire Officials / Emergency Management | | Continuous | | 0 |

Initiative (Action)

14. Examine the current agreements within the county and assess the need to expand or update cooperative agreements for firefighting resources. Include agreements with local, state and federal agencies.

Background / Benefits

Cooperative agreements provide the support needed in times of emergency, and are an important element of planning, with the long-range goal of reducing damage to structures and systems within the jurisdiction.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.3, 1.4, | Local | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Prevention | Leavenworth (UnInc.) | Wildfire | Moderate | Rural Fire/ Emergency Management | | December 31, 2015 | | 0 |

Initiative (Action)

15. Appoint a rural fire committee to schedule meetings with the Kansas Forest Service to map suspected hazardous wildfire areas in the county for potential participation in the Community Wildfire Protection Program (CWPP).

Background / Benefits

In order for a community to take advantage of the Community based Healthy forests Restoration Act (HFRA), 2003, a community must develop a Community

Wildfire Protection Plan (CWPP). To develop qualifications the community must identify and map potential hazard areas as an initial step towards participation in the program.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.4, 4.1, | Local/State/Federal | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Prevention | Leavenworth (UnInc.) | Wildfire | Moderate | Rural Fire/ Emergency Management | | December 31, 2015 | | 0 |

Initiative (Action)

16. Incorporate wildfire maps, develop actions and projects for wildfire prevention, and complete an assessment report to meet CWPP requirements for submittal to the Kansas Forest Service.

Background / Benefits

The minimum requirements participation in the CWPP as described in the HFRA are: (1) Collaboration: A CWPP must be collaboratively developed by local and state government representatives, in consultation with federal agencies and other interested parties. (2) Prioritized Fuel Reduction: A CWPP must identify and prioritize areas for hazardous fuel reduction treatments and recommend the types and methods of treatment that will protect one or more at-risk communities and essential infrastructure. (3) Treatment of Structural Ignitability: A CWPP must recommend measures that homeowners and communities can take to reduce the ignitability of structures throughout the area addressed by the plan.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.2, 1.4, 4.1, 4.2, | Local/State/Federal | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Prevention | Leavenworth (UnInc.) | Multi-Hazard | Moderate | Emergency Management / County GIS Department | | Continuous | | 0 |

Initiative (Action)

17. Develop cross-departmental information collection capabilities, and incorporate cadastral (building/parcel) data utilizing a GIS for purposes of conducting more detailed hazard risk assessments and for tracking permitting / land use patterns, buildings and infrastructure replacement costs, and overall structural accounting for the county.

Background / Benefits

A comprehensive catalog of data can greatly enhance the county's technical capability to manage, analyze and display spatially referenced data. Leavenworth County has GIS capabilities available through the Leavenworth GIS Department. Further development of this capability for functional use across all departments will enhance the county's overall capabilities to document building/structure cost data, and further hazard mitigation goals in developing cadastral data for the county.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.2, | KDEM, Local, and grants | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Property Protection | Leavenworth (UnInc.) | Dam/Levee | High | Emergency Management Department | | December 31, 2015 | | 0 |

Initiative (Action)

18. Develop an annex to the Local Emergency Operations Plan (LEOP) for dam/levee failure response and evacuation plans for high hazard dams/levees in Leavenworth County.

Background / Benefits

Leavenworth County has 221 dams in the county that are regulated by the Kansas Department of Agriculture, Water Resources Department. Seven of these structures are classified as "High Hazard Class C" structures, and are owned by various private, State, and Federal agencies. The State evaluation of the dams is based on location in areas where failure may cause extensive loss of life, serious damage to homes, industrial and commercial facilities, important public utilities, main highways or railroads. It is important to note that a high hazard dam is not necessarily unsafe, as defined by the State of Kansas. An individual dam's hazard classification is based upon the potential consequences of dam failure and does not reflect the physical condition of the dam. Preparing for a potential emergency is an essential planning step to secure the people and property downstream from a potential breach or dam failure. There are also an estimated 48 levees reported in the county, of which four (4) are owned by the county. Ownership for the remaining levees is listed as unknown.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.1, 2.1, | Local | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Prevention | Leavenworth (UnInc.) | Flood | Moderate | Planner | | December 31, 2015 | | 0 |

Initiative (Action)

19. Seek funding to complete a stormwater drainage study for Leavenworth County that will lead to a stormwater management ordinance that maintains pre-development runoff rates. The study should include an evaluation of existing dams/levee systems, vulnerable streams, and other major waterways in the county that may impact growth patterns established for the county.

Background / Benefits

Stormwater management best practices for Leavenworth are addressed in the Leavenworth County Land Use Plan. According to the Plan, guidance is to protect environmentally sensitive land and maintain open space, and adopting a stream setback policy for all new developments. A stormwater drainage study/plan will identify drainage problems and address solutions through detention, retention, and drainage system maintenance among other specific mitigation measures.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.1, 1.2, 2.1, 2.2, | State of Kansas/ FEMA | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Emergency Services | Leavenworth (UnInc.) | Dam/ Levee Failure | High | Emergency Management Department | | December 31, 2015 | | 0 |

Initiative (Action)

20. Research and contact all owners of high hazard dams in the county, and inform them of their responsibility to provide Emergency Action Plans to the Leavenworth County Emergency Management as prescribed by the Kansas Department of Agriculture – Water Resources Division, Chief Engineer. Additionally, Levee owners should be contacted regarding potential PM 43 requirements for continued validation of protected areas behind the levees.

Background / Benefits

Leavenworth County has 221 dams in the county that are regulated by the Kansas Department of Agriculture, Water Resources Department. Seven of these structures are classified as “High Hazard” structures. These seven dams should have Emergency Action Plans on file with emergency management for the protection of life and property downstream of these structures. The State evaluation of the dams is based on location in areas where failure may cause extensive loss of life, serious damage to homes, industrial and commercial facilities, important public utilities, main highways or railroads. It is important to note that a classification as “High Hazard” is not necessarily unsafe, as defined by the State of Kansas. An individual dam or levee hazard classification is based upon the potential consequences of dam failure and does not reflect the physical condition of the dam. Preparing for a potential emergency is an essential planning step to secure the people and property downstream from a potential breach or dam failure. Approximately 48 levees were identified in Leavenworth County. Certifications are unknown at the time of this Plan.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.1, 2.1, | Local | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Property Protection | Leavenworth (UnInc.) | Multi-Hazard | High | Planning Commission / Planner | | December 31, 2015 | | 0 |

Initiative (Action)

21. Research and recommend appropriate building codes for the Jurisdiction that includes wind-resistant design techniques for new construction.

Background / Benefits

Currently, Leavenworth County does not have any building code requirements. Incorporated and unincorporated areas of the county should adopt and enforce codes that require certain minimum building practices and contractor licensing for wind loss reduction. Experts agree that structures built to exceed high wind provisions have a much greater chance of surviving violent windstorms. Additional techniques include adding protection for windows (i.e., shutters), anchoring door frames with multiple hinges, stiffening garage doors with additional bracing, reinforcing masonry chimneys with vertical steel, and strengthening connections between walls and the roof with hurricane straps and ties. These techniques should be promoted to building contractors and homebuyers by the county for all new residential construction, to the maximum extent possible during the building permit process.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 2.3, | Local | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Public Information and Awareness | Leavenworth (UnInc.) | Flood | Moderate | County GIS | | December 31, 2015 | | 0 |

Initiative (Action)

22. Establish a local reserve fund to augment the Leavenworth County GIS Department’s ability to monitor building trends and erosion patterns across the county through frequent aerial photography.

Background / Benefits

Utilization of GIS capabilities should be expanded to include monitoring of county topography and water erosion changes a minimum of four times a year. This frequency will allow development of additional GIS layers for future planning, and also assist in identifying mitigation of potential problem areas before they become a major issue for the county.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.1, 1.2, | Local/State/Federal | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Public Information and Awareness | Leavenworth (UnInc.) | Multi-Hazard | Moderate | Leavenworth County GIS | | December 31, 2015 | | 0 |

Initiative (Action)

23. Establish a local reserve fund to develop and support an interactive GIS webpage for the general public.

Background / Benefits

Development and implementation of a county interactive webpage would provides real-time GIS data that will provide an effective training tool, as well as education references for home school, and research activities.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 4.1, | Local/State/Federal | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Property Protection | Leavenworth (UnInc.) | Multi-Hazard | Moderate | Big Stranger Drainage District | | Continuous | | 0 |

Initiative (Action)

24. The Big Stranger Drainage District will continue the care and maintenance, including debris removal, of the portion of the Big Stranger Creek that is located within the Drainage District.

Background / Benefits

The Big Stranger Drainage District contains 16,730 acres within Leavenworth County. The general mission of the drainage district is to see that the Big Stranger Creek is free of of debris on the portion of the creek that is located within the Drainage District. The organization will evaluate the need for further maintenance

projects, and additional effort will be made to seek alternative funding as they become available.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.1, 1.2, | Local / State / Federal | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Property Protection | Leavenworth (UnInc.) | Multi-Hazard | Moderate | Leavenworth County Consolidated RWD No. 1 | | Continuous | | 0 |

Initiative (Action)

25. The Leavenworth County Consolidated Rural Water District (RWD) No. 1 will continue to assess the impact of natural hazards on water distribution lines, systems, and equipment. The Water District will also seek funding sources to mitigate damage to critical infrastructure, and seek funding for various water main improvement projects.

Background / Benefits

The Leavenworth County Consolidated RWD No. 1 provides potable water to their customers in Leavenworth County. Maintaining an adequate, quality water supply to their customers is the district's top priority.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.2, 3.2, | Local / State / Federal | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Emergency Services | Leavenworth (UnInc.) | Wildfire | Moderate | Rural Fire Departments and Leavenworth County RWD 7 | | December 31, 2015 | | 0 |

Initiative (Action)

26. Maintain, repair, and collect GPS locations of fire hydrants within the Leavenworth County area served by Leavenworth County Rural Water District (RWD) 7.

Background / Benefits

Currently, there is no GIS mapping of the fire hydrants located within the Leavenworth RWD 7 boundaries. The maintenance and repair, as well as the GPS mapping of the fire hydrant locations, could benefit response time of the applicable fire departments serving the areas.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.2, 1.3, 1.4, 4.1, | Local / State / Federal | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Property Protection | Leavenworth (UnInc.) | Multi-Hazard | Moderate | Leavenworth County RWD 7 | | Continuous | | 0 |

Initiative (Action)

27. The Leavenworth County Rural Water District (RWD) No. 7 will continue to assess the impact of natural hazards on water distribution lines, systems, and equipment. The Water District will also seek funding sources to mitigate damage to critical infrastructure, and seek funding for various water main improvement projects.

Background / Benefits

The Leavenworth County RWD No. 7 provides potable water to their customers in Leavenworth County. Maintaining an adequate, quality water supply to their customers is the district's top priority.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.2, 3.2, | Local / State / Federal | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Prevention | Leavenworth (UnInc.) | Multi-Hazard | Moderate | Leavenworth County RWD 7 | | December 31, 2015 | | 0 |

Initiative (Action)

28. Obtain funding for the purchase of mobile backup power generators for the groundwater well facilities of Leavenworth County Rural Water District (RWD) 7.

Background / Benefits

Leavenworth County RWD 7 has identified a need to quickly restore power in its groundwater well facilities in the event of a weather event and the subsequent loss of power.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 3.1, 3.2, | Local / State / Federal | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Emergency Services | Leavenworth (UnInc.) | Multi-Hazard | Moderate | Suburban Water, Inc. | | December 31, 2015 | | 0 |

Initiative (Action)

29. Suburban Water, Inc. will seek funding to prepare a written Emergency Operations Plan to be used as a resource during the initial response to an emergency event and provide guidance until all operations affected are back to normal operation.

Background / Benefits

Suburban Water, Inc. has identified the need to have an Emergency Operations Plan prepared in anticipation of emergency response.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.2, 3.2, | Local / State / Federal | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Prevention | Leavenworth (UnInc.) | Multi-Hazard | Moderate | Suburban Water, Inc. | | Continuous | | 0 |

Initiative (Action)

30. Suburban Water, Inc. will continue to assess the impact of natural hazards on its water supplies, distribution and transmission systems, storage facilities, structures and equipment. Suburban Water, Inc. will also seek funding sources to mitigate damage to critical infrastructure, and seek funding for various water main improvement projects to enhance reliability of service.

Background / Benefits

Suburban Water, Inc. provides potable water to its customers which are located in southern Leavenworth County. Providing a safe, reliable, and high quality water supply to all present and future customers is Suburban Water's top priority.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.2, 3.2, | Local / State / Federal | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Prevention | Leavenworth (UnInc.) | Multi-Hazard | Moderate | Suburban Water, Inc. | | December 31, 2015 | | 0 |

Initiative (Action)

31. Suburban Water, Inc. will continue to enhance the reliability of its supervisory control and data acquisition (SCADA) system used to monitor the supply of water throughout its distribution system. Suburban Water, Inc. will also seek funding sources to further expand the capabilities of its SCADA system.

Background / Benefits

Suburban Water, Inc. has identified a need to expand the capabilities of its current SCADA system.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.2, 3.2, | Local / State / Federal | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Prevention | Leavenworth (UnInc.) | Multi-Hazard | Moderate | Suburnban Water, Inc. | | Continuous | | 0 |

Initiative (Action)

32. Suburban Water, Inc. will continue to pursue opportunities to establish interconnections with the City of Leavenworth Water Department, Rural Water District No. 7 of Leavenworth County, and Rural Water District No. 9 of Leavenworth County, to enhance the reliability of their water supplies. Suburban Water, Inc. will also seek funding to establish the interconnections.

Background / Benefits

Suburban Water, Inc. has identified a need to establish interconnections with other water suppliers in an attempt to enhance the reliability of the water supply in Leavenworth County.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.2, 3.2, | Local / State / Federal | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Prevention | Leavenworth (UnInc.) | Multi-Hazard | Moderate | Suburban Water, Inc. | | Continuous | | 0 |

Initiative (Action)

33. Suburban Water, Inc. will seek funding to improve the reliability of its water supply from the Board of Public Utility (BPU) of Kansas City, Kansas.

Background / Benefits

Suburban Water, Inc. has identified a need to improve the reliability of its water supply through the BPU.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.2, 3.2, | Local / State / Federal | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Prevention | Leavenworth (UnInc.) | Multi-Hazard | Moderate | Suburban Water, Inc. | | Continuous | | 0 |

Initiative (Action)

34. Suburban Water, Inc. will seek funding to complete hydrogeological studies and investigations for the purpose of seeking to find additional reliable water sources.

Background / Benefits

Suburban Water, Inc. has identified a need to find additional reliable water sources for its customers in Leavenworth County.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.2, 3.2, | Local / State / Federal | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Prevention | Leavenworth (UnInc.) | Multi-Hazard | Moderate | Suburban Water, Inc. | | December 31, 2015 | | 0 |

Initiative (Action)

35. Suburban Water, Inc. will seek funding to develop and establish backup electric power supplies at pumping stations in case of primary power outages.

Background / Benefits

Suburban Water, Inc. has identified a need to quickly restore power in its pumping stations in the event of a weather event and the subsequent loss of power.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 3.1, 3.2, | Local / State / Federal | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Property Protection | Leavenworth (UnInc.) | Multi-Hazard | Moderate | Suburban Water, Inc. | | December 31, 2015 | | 0 |

Initiative (Action)

36. Suburban Water, Inc. will seek funding to develop a secure and protected structure at its headquarters to allow continuous operations during natural disasters.

Background / Benefits

Suburban Water, Inc. identified a need to develop a secure and protected structure at its headquarters to allow continuous operations during natural disasters.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 3.1, 3.2, | Local / State / Federal | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Property Protection | Leavenworth (UnInc.) | Flood | Moderate | Suburban Water, Inc. | | December 31, 2015 | | 0 |

Initiative (Action)

37. Suburban Water, Inc. will seek funding to enhance the protection to existing water mains at creek crossings (flood plains).

Background / Benefits

Suburban Water, Inc. identified a need to enhance the protection to existing water mains at creek crossings that are located within flood plains.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.1, 3.1, | Local / State / Federal | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Property Protection | Leavenworth (UnInc.) | Multi-Hazard | Moderate | Leavenworth Water Department / Leavenworth County (Uninc.) | | Continuous | | 0 |

Initiative (Action)

38. The Leavenworth Water Department will continue to assess the impact of natural hazards on water distribution lines, systems, and equipment. The Department will also seek additional funding sources to mitigate damage to critical infrastructure.

Background / Benefits

The Leavenworth Water Department provides potable water to their customers throughout Leavenworth County, encompassing approximately 55,000 residents. The Department's facilities also includes approximately 180 miles of water transmission and distribution lines, pumping stations, well field, and five million gallons of potable water storage.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 1.2, 3.2, | Local / State / Federal | | |

| Category | Jurisdiction | Hazard | Priority | Assigned To | Commence Date | Target Complete Date | Anticip. Duration | % Complete |
|---|---|---|---|---|---|---|---|---|
| Property Protection | Leavenworth (UnInc.) | Utility Failure | Moderate | City / County Planners / RECs | | December 31, 2015 | | 0 |

Initiative (Action)

39. Coordinate county and local government mitigation efforts with Rural Electric Cooperatives (REC's), encourage identification of hazards potentially affecting their infrastructure, assessment of the vulnerabilities of the infrastructure to these hazards, and identification of mitigation strategies.

Background / Benefits

Long-term planning goals that will reduce exposure to loss of electrical power are beneficial to all organizations and citizens within the jurisdiction. Power loss during extreme periods of cold or heat increase damage potential to people and property.

| Goal.Objective | Funding Sources | Actual Complete Date | Notes |
|---|---|---|---|
| 3.2, | N/A | | |